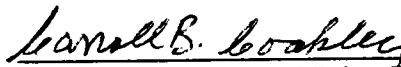
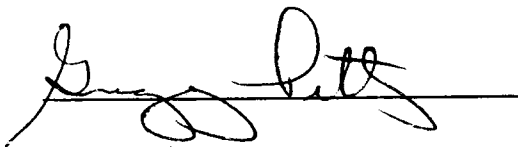


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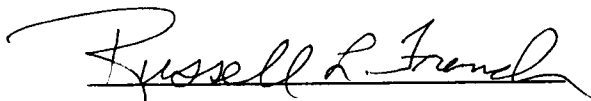
I am submitting herewith a dissertation written by Patricia S. McCurry entitled "A Developmental Study of Effective Instructional Activities for Perceptual Modality Dominance in Tennessee Marketing Education." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, in Human Ecology.


Carroll B. Coakley, Major Professor

We have read this dissertation
and recommend its acceptance:







Accepted for the Council:


Associate Vice Chancellor and
Dean of the Graduate School

**A DEVELOPMENTAL STUDY OF EFFECTIVE INSTRUCTIONAL ACTIVITIES
FOR PERCEPTUAL MODALITY DOMINANCE IN
TENNESSEE MARKETING EDUCATION**

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Patricia S. McCurry

May 1995

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DEDICATION

This dissertation is dedicated to all the learners
who want to learn and think they cannot,
and to all the instructors
who want to help but do not know how.

ACKNOWLEDGMENTS

Special recognition and sincere thanks go to my doctoral committee for their advice and support during this educational process: Dr. Carroll Coakley, committee chair, Dr. Walter Cameron, Dr. Greg Petty, and Dr. Russell French. Each has contributed to my educational and personal growth.

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Family and friends have been supportive during this endeavor, and special recognition goes to my angel mother and my father, Karen, Linda, Barbara and their spouses, Michael, Jim, and Doug. I appreciate the frequent calls and visits from Susie and Robyn and especially former doctoral students, Paula and Martha. Lots of dissertation support has come from Gail, Sally, Doris, Beverly, Vivian, and especially from MMPALT II specialists Donna and Marsha. Many thanks!

I thank Sherry Guy, who said when I completed the master's degree, "You are going to finish, aren't you?" Special thanks goes to pianist Sandy Owen for providing three years of an "enriched environment."

ABSTRACT

The purpose of the study was to provide information useful for teacher education in perceptual modality instructional techniques. The study also determined the most effective instructional activities for Marketing Education instruction and classified those activities into a framework according to perceptual modality. The study was designed to gather data in two phases and compile the results into an instructional framework to be used as a resource in education.

During Phase I of the study, the population of Tennessee Marketing Education Instructors was surveyed to determine effective instructional activities. Of the 138 instructors, 117 (85%) responded by evaluating 62 instructional activities as "effective," "not effective," or "not applicable." The instructional activities were drawn from the current Tennessee Curriculum Guide for Marketing Education.

During Phase II of the study, a national panel of experts used the Delphi Technique to classify the instructional activities used in Phase I according to perceptual modality dominance. Using the seven elements exclusive to the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II), panel members classified each activity by dominant element and optional secondary element. The perceptual modality elements used are print, aural, interactive, visual, haptic, kinesthetic, and olfactory. The result of the three probes was consensus for classification of all activities and 100% participation from the 10 member Delphi panel of experts.

The resulting hierarchy of effective instructional activities from Phase I of the study was combined with the perceptual modality element classification for each activity. The result was an instructional framework resource that combined the hierarchy of effective instructional activities with the hierarchy of perceptual learning modalities based on MMPALT II research conducted by James and Blank (1991b). The framework lists both dominant and secondary element classifications in a two-level resource for educators.

The findings of the study led to the following conclusions:

1. The instructional activities provided in the curriculum guide were considered to be effective by the majority of Marketing Education instructors.
2. The activity selection in the curriculum guide could be improved by including more haptic, kinesthetic, and olfactory perceptual element activities.
3. When comparing the perceptual modality styles most predominant in learners and perceptual modality elements represented in the curriculum guide, the representation of activities is not congruent with learner needs.
4. The Delphi process was effective as a convergence technique to analyze panelist input, to identify issues, and to classify the instructional activities.

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CHAPTER 1

INTRODUCTION

Currently, a great deal of public attention in the United States is focused on educational reform. Concern has been expressed about the lack of academic performance in our schools, and the resulting measure in gain scores is poor in comparison to other nations. To address this concern, educational decision makers are seeking new designs for improved educational achievement. The current focus for reform is centered on new assessments, new standards, new technology, and new curriculum frameworks. Concurrently, productive innovations are sought by public and private education as well as by industry.

While program and curriculum changes are proposed, large-scale redesign takes time. However, instructional changes within individual classrooms can be in place relatively quickly. Educators may serve the student population more effectively by using improved methods of instruction based on individualized learning. A higher domain for individual learning is exemplified by breaking the traditional mold cast in school for developing only the expected intelligences: linguistic and logical. In Gardner's Frames of Mind (1983), multiple intelligences are proposed as higher domains that make up an individual's gifts or personal strengths. He theorizes that these gifts are one or more of seven intelligences.

These intelligences, linked to sensory modes, are paths for accelerated learning that may be addressed by specific instructional techniques.

Theories for accelerated learning center around the individual nature of learners. The concept of the uniqueness of individual learners has been addressed by researchers and theorists but has had limited applied use in the classroom. Ideally, teachers are challenged to provide maximum learning experiences to meet individual student needs. The problems, however, of large, intact classes and the "mass instruction" methods of lecture and assigned reading are common in today's classroom. With large numbers of learners within a class, instructors, realistically, cannot teach each student individually each day. As a result, the majority of instructors teach through the traditional lecture method, but only 20-40% of the students learn best aurally (Dunn & Dunn, 1978; Goodlad, 1984). This "mismatch" represents missed opportunities for learning. Garger, a leader in learning style and curriculum design, observed, "We know that people learn differently. The problem is trying to fit this knowledge into a system that's not set up to accommodate individual differences" (O'Neil, 1990, p. 6).

Efforts to develop methods that address individual differences and problems common to the traditional classroom yield positive results when learning style applications are used in instruction. Learning style instruction addresses a diversity of learners and is based on how these learners take in and process information. Often, teachers may not use learning style instruction because of lack of knowledge about the concept and its use in the classroom. By using a

variety of instructional activities, different styles of learning may be addressed, and students with similar needs will learn simultaneously. Learner competency is obtained when specific learning tasks are selected by the instructor to suit individual student learning differences. Dunn, a leader in perceived learning styles research and measurement, is well known for her instructional philosophy: "When students cannot learn the way we teach them, we must teach them the way they learn" (Dunn, 1990, p. 18).

An effective method of instruction which could be utilized today in learner-specific classrooms is teaching to student perceptual learning styles. The perceptual modality style is recognized as effective because it addresses one or more of the five senses common to the majority of learners. The senses--sight, hearing, taste, smell, and touch--present a sensory learning system that is different for individual learners. By using instructional methods that present multi-sensory means of learning, instructors may effectively teach more learners.

In order to address the unsatisfactory state of our educational "product" and to ease the transition into a different instructional approach, this developmental study was pursued as one part of reform. The study is based on perceptual modality learning style and its use with effective instructional activities. The result of the study will be an instructional resource that combines effective activities with their perceptual modality classification. A developmental research format was used because no other studies have been done for the same purpose. The study serves to provide a link between learners who are not being effectively

taught in our educational system and the effective instructional opportunities of perceptual modality learning theory.

STATEMENT OF THE PROBLEM

The most common form of instruction at the secondary level is lecture, often referred to as the "traditional" style. The exception is when teachers use their own style of learning as the basis for their teaching. An instructor who consistently employs the conventional lecture method and/or his/her own teaching style may not know how to address the variety of perceptual learning styles present in a group of learners.

Instructors' lack of knowledge in how to address perceptual learning styles in the classroom and the lack of a resource for identification of perceptual instructional activities constitute a need for research. The problem of the study was to determine the effectiveness of a variety of instructional activities and their classification for accommodating the perceptual learning styles of secondary school learners.

PURPOSE OF THE STUDY

The purpose of the study was to provide information useful for Marketing Education instructors in applying effective perceptual modality instructional

techniques. The specific purposes of the study were 1) to identify the activities perceived by Marketing Education instructors to be effective and the perceptual style orientations of those activities as identified by experts in perceptual learning style research and 2) to develop a framework for instructional planning that provides Marketing Education instructors both dimensions of the activities as an available resource.

RESEARCH QUESTIONS

To achieve the purpose of the study, three research questions were posed:

1. What instructional activities are perceived to be most effective by Tennessee Marketing Education instructors as determined by a survey using activities drawn from the state curriculum guide?
2. How would a national panel of experts on perceptual modality classify effective instructional activities according to perceptual modality elements using the Delphi Technique?
3. Can a framework be developed to combine effective teacher-directed instructional activities as identified by instructors and perceptual modality classification as determined by the consensus of expert opinion?

THEORETICAL FRAMEWORK

The guiding framework for the study encompasses three areas:
individualized instruction, learning styles, and instructional activities.

Individualized Instruction

The continental European tradition of learning theory is derived from Plato and Socrates, whose theories of education placed emphasis on the uniqueness of the individual child and the structural frameworks of mental growth. From this tradition, Pestalozzi theorized in the 1700s that education should be appropriate to the individual child and that specially trained teachers are necessary (Talmage, 1975). Piaget, also of this tradition, characterized the child not by continuous development but through development by stages. The gradual synthesis of continental and Anglo-American traditions of learning theory resulted in Piaget's theory which established more emphasis on the individual learner (Walberg, 1975). In this tradition, Gagné (1967) and Lowenfeld (1939) held that information is received and processed within an individual framework. Both theorists, along with Dewey (Walberg, 1975), believed in learner-centered education and that learning is based on individual differences.

The theory of individual learning was tried in the classroom in the late 1960s. The individual emphasis continued and was supported by changes in curriculum structure in the 1970s. Other leaders in education, Taba (1962) and

Goodlad (1966), also addressed the importance of individual differences in instruction. Theorists such as Bruner and Bloom proposed that the method in which information is presented to learners may be more important in learning than the aptitude of the learners. The important variables which they identified were time given to instruction, teaching method, and student learning style (Marshall, 1987).

The associationist tradition reflects learning theories regarding the linkage of ideas. The concern is how complex ideas are constructed in the mind from basic sense impressions. New interpretations to this tradition advocated by American psychologists James and Dewey were summarized by Gagné (1977). Their view was that the nervous system, rather than the mind, was of central importance in understanding how the senses were connected to behavior and the role of action in learning.

Theories of individual learning, adaptive curricula and instructional delivery for the individual, and the importance of the senses in learning give direction to new curriculum designs and instructional strategies.

Learning Style

The term "learning style" was first introduced by Thelen (1954). One interpretation of learning style was offered by Keefe, who said, "learning styles are cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment"

(1982, p. 44). Research supports the theory that students learn better through instruction that addresses their learning styles and that styles may be measured (Cafferty, 1980; Dunn, 1982; Dunn & Dunn, 1978; Reiffe, 1992; Shea, 1983).

Models regarding learning style have evolved with dimensions and modalities in varying formats. One format was developed in 1980, when French and other learning style researchers met to clarify learning style terminology and construct a conceptual framework for the perceptual modality learning style theory. The heading "learning styles" in Table 1 was used to encompass the field of study for learning types, personal styles, and other terms related to learning styles. The four dimensions, as part of the conceptual learning style framework, include perceptual, cognitive, social, and emotional modalities. Listed below each modality were elements specific to that modality type. The perceptual elements were of primary focus. These elements--print, aural, visual, interactive, haptic, kinesthetic, and olfactory--are specifically defined in "Definition of Terms." Each addressed a sensory input mode of learning (French, 1975a). The resulting learning style model served as a resource for instructional activities classification in the study.

Principles in learning style theory that continue to influence new directions in current/proposed instructional methods are that learning styles are stable indicators of learner response to the environment, improved learning takes place through instruction that addresses the learning style, and that perceptual elements from the French Learning Style Framework can influence instructional techniques.

Table 1**Conceptual Framework of Learning Style****Learning Style**

<u>Perceptual Modality</u>	<u>Cognitive Modality</u>	<u>Social Modality</u>	<u>Emotive Modality</u>
<u>(Elements)</u>	<u>(Elements)</u>	<u>(Elements)</u>	<u>(Elements)</u>
Print	Sequential	Independent	Sanguine
Aural	Logical	Collaborative	Choleric
Interactive	Intuitive	Cooperative	Phlegmatic
Visual	Spontaneous		Melancholy
Haptic			
Kinesthetic			
Olfactory			

Source: French, R. L. (1980)

Instructional Activities

Instructional activities should be designed not only for the individual learner but for his/her dominant perceptual modality. Talmage (1975) introduces perceptual modality as a stimulus for individual learners. He emphasizes that modes of communication in media, materials, and people are important as learning stimuli for individual learners. The sensory combination in communication sends a different message to different learners. For example, some learners interact more effectively with stimuli presented visually instead of orally. In order to design an individualized instructional program, the individual learner must be considered before selecting learning media.

In developing instructional activities that address the individual learner, several considerations are common to individualized educational systems. Common features include flexibility in teaching to allow for personal characteristics, core objectives in combination with self-selected objectives, attention to individual starting points, a system for monitoring learner progress, and varying instructional activities to include individual, small group, and large group activities. Use of modules or units allows students to be more self-directive (Briggs, 1975).

Instructional activities that address both group needs and individual learner needs make the best combination for instruction. Briggs, instructional design researcher, agrees: "The selection of media is often based on what is believed to be best for the majority of a group of learners. But when resources permit provision for parallel media for the same objective, one can then attempt to select a medium for each individual learner" (Briggs, 1975, p. 177).

Theories drawn from instructional activities literature and applicable to the study focus on the individual learner. Activities should be designed for the dominant perceptual modality of the learner, and the learner is best served by activities that address both individual and group needs.

RATIONALE

The purpose of the study was to provide information useful for Marketing Education instructors in applying effective perceptual modality instructional techniques. By having the resulting perceptual modality instructional activity framework as a resource, teachers have an opportunity to

1. Become aware of different learner styles. Educated awareness is a key to beginning the process.

2. Become aware of their own teaching style(s). Understanding teacher styles helps them to expand the range of their instructional patterns.

3. Become better informed about the effectiveness of addressing a variety of styles. When students are taught in their strongest or dominant style, they learn more effectively.

4. Become aware of specific learning activities that when tailored to the learner's dominant style result in achievement and a higher level of learner motivation.

5. Become aware of the potential for a perceptual modality instructional resource to enhance student achievement (Guild & Garger, 1985).

LIMITATIONS

Limitations were imposed on the study:

1. Perceptual learning modalities, rather than other learning style theories, were the sole focus of the study.

2. The perceptual style model used as the basis for the research was that constructed by French and validated by a series of researchers (Akins, 1983/1984; Brown, 1984/1985; Cherry, 1981/1982; Coolidge-Parker, 1989/1990; Gilley, 1975/1976; Grady, 1992/1993; Harden, 1992; Hutchinson, 1992; James & Blank, 1991a, 1991b; Lucas, 1985; Nix, 1983/1984; Rice, 1984/1985; Russell, 1984/1985; Ryder, 1992; Schaiper, 1983/1984) using the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II) to identify the perceptual styles of individual learners.

3. Learning activities used in both phases of the study were selected from the Tennessee Curriculum Guide for Marketing Education published in 1989 and used in the academic school year 1993-1994.

4. The research focused on instruction in Marketing Education in Tennessee. The results may not be generalized to other curricular areas or to other states.

DEFINITION OF TERMS

Delphi Technique -- A method of securing and refining group judgment by use of a panel of experts. Procedures include anonymous response, iteration and controlled feedback, and statistical group process (Dalkey, 1969).

Effective Instructional Activity -- An activity or strategy that produces learner achievement.

Dominant Style -- A learner strength in one or more of seven perceptual modality elements.

Dominant Element -- Used in the classification of instructional activities to describe one of seven perceptual modality elements where more of that sense is addressed or a larger percentage of the activity is taken up with that element. If all perceptual elements were equally represented in a class with varied perceptual learning styles, this element would reach more learners.

Higher Domain of Learning -- Thought patterns or standards that exceed the status quo or accepted norm in the current educational structure.

Learning Style -- The cognitive, affective, physiological traits that are indicators of how individuals perceive and respond to the learning environment (Keefe, 1982).

Modality -- The channel(s) by which learning occurs. One of four learning style divisions: perceptual, cognitive, emotional, and social (Cherry, 1981/1982; French, 1980; Gilley, 1975/1976).

Modality Preference -- Modality strongest for learning usually determined by a pencil and paper test producing results that are learner perceived rather than an actual test of learning mode.

Modality Strength -- An actual rather than perceived learning modality. Used to denote the strongest element of seven perceptual modes for the learner or to denote one of four learning style modalities proposed by French: perceptual, cognitive, social or emotional modality.

MMPALT II -- Multi-Modal Paired Associates Learning Test, Revised. Originally conceptualized by French, the instrument has been developed, tested, and confirmed for validity, then refined and modified by a series of researchers to address a total of seven perceptual learning styles in a paired associates learning format:

Print- dependent upon reading and writing; gathering information primarily through the printed word.

Aural- dependent upon hearing; gathering information primarily through listening.

Interactive- dependent upon talking and discussing; gathering information primarily through discussion and talking with others.

Visual- dependent upon seeing; gathering information primarily through seeing pictures, images, objects, and activities.

Haptic- dependent upon touching; gathering information primarily through touching and/or holding.

Kinesthetic- highly mobile with active involvement; gathering information primarily through performance or engaging in body movements.

Olfactory- gathering information primarily through the sense of smell (Cherry, 1981/1982; Gilley, 1975/1976).

Multi-Modal -- Used to describe activities that have more than one perceptual element classification. Used interchangeably with multi-sensory.

Perceptual -- Relating to the senses: sight, hearing, touch, smell, and taste.

Perceptual Modality or Style -- The dominant use of one or more senses to collect information.

Secondary Element -- Used in the classification of instructional activities to describe one or more of seven perceptual modality elements where that sense is second for all perceptual elements being accessed by the learner. This classification was assigned after the dominant or primary element was determined. It is often referred to as "second most dominant" in the study text.

Width of Elements -- Used to describe the range or number of perceptual elements from one to seven, which, when grouped by number of elements, it may be used for tracking the convergence or narrowing of elements during the classification process.

ORGANIZATION OF THE STUDY

Chapter 1 presents an introduction to the study. A theoretical framework for the study is presented; questions addressed by the study are listed; the scope, rationale, and limitations of the study are presented; and terms used in the study are defined.

Chapter 2 contains a review of relevant literature organized to support the theoretical framework which guided the study. The framework has three major sections: individualized instruction, learning styles, and instructional activities. Sections of related research regarding the MMPALT II and the Delphi Technique also are included.

Chapter 3 describes the methods and procedures used in a two-part research format. The subjects, instrumentation, and data collection components of the state-wide study, using Marketing Education instructors' evaluations, and the Delphi classification of instructional activities are described in detail.

Chapter 4 presents results from this two-part study. The state-wide survey of Marketing Education instructors produced evaluations of instructors' agreement for effectiveness for instructional activities selected from the Tennessee Curriculum Guide for Marketing Education. The Delphi process produced data regarding experts' assignment of dominant perceptual style orientations to the instructional activities rated by Marketing Education instructors.

Chapter 5 summarizes the study, and presents the major findings, conclusions, recommendations, and implications for application of the study results.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The review of literature addresses four topics from historical and research perspectives. They include individualized instruction, learning styles, instructional activities, and related research. Additional sections of the chapter include a discussion of the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II) and the Delphi Technique.

INDIVIDUALIZED INSTRUCTION

Historical Perspective

The theory of individual instruction has been traced to Eliot of Harvard prior to 1890 (Keefe, 1987). Other accounts credit German psychologists with studies of how individuals differed in learning in the early 1900s (Hawkins, 1987/1988). Individual differences have prompted adaptive education since the turn of the century (Wang, 1992). It was Cronbach's (1967) hypothesis that the learning rate is central in importance and is dependent on adapting instruction. He maintained that adapting the instructional technique is more important to successful learning than exposing students to subject matter for an extended period of time. Jensen (1962) proposed that education systematize the process of

adapting instruction and called for a theory in which propositions would state which conditions of instruction were best for certain types of pupils (Cronback, 1967). Classroom strategies for individual learning gained popularity in the 1960s and 1970s where individual learner needs were addressed through a variety of approaches. Wang (1992) summarized individual differences as the basis for individual instruction:

Growing evidence suggests a great variability in the ways that students acquire, organize, retain, and generate knowledge and skills. Furthermore, these variations may be attributable to students' adoption of particular learning processes that they perceive to be pertinent to the task at hand. Such findings have resulted in attention to individual differences in learning processes. (p. 2)

Principles in the literature about the history of individualized instruction which continue to be important today are individual differences in learning, individual rates of learning, and matching the method of instruction to the type of learner.

Classroom Application

Educational experts agreed that individualizing instruction is beneficial to the student. Given that an instructor cannot teach each child in a one-to-one situation, the question remains as to how to effectively individualize in the traditional setting of a self-contained classroom. The resulting strategies suggested for independent study included learning packets, student contracts, use of learning centers, and programmed instructional materials (Thornell, 1980).

The period of the 1960s and 1970s was noted for innovation and individualized instruction. In the 1960s the learning laboratory became popular in which the learner's individual needs were addressed through a variety of approaches. The most common approaches to individualized instruction included stand-alone units for student self-study, audio-tutorials, mini-courses, learning packages, programmed instruction, and competency-based instruction (Bock & Tompkins, 1980).

The concept of individualizing education through contracting was first adopted in Florida in 1964. It has since been used at all educational levels as a technique of clarifying student goals, methods for goal attainment, measures of evaluation, and credit to be given for goal attainment. It allowed flexibility in individualized learning and program design (Berte, 1975).

Major principles of individualized instruction applied to current classroom strategies include varied methods of instruction and the use of methods that required advance planning to attain individual learning goals.

Curriculum Classification System

The Annehurst Curriculum Classification System (ACCS), developed primarily by Frymier in the 1970s, was a system that grew from his research interest in human motivation and individualized instruction. The ACCS is a matching process for linking curriculum materials and individual learners. The conceptual framework for the development of the system is structured on 1) the

interaction of the learner and the environment, 2) the purposes of schooling, 3) individual differences, and 4) the conditions necessary to foster individual growth. The ACCS was based on the interaction of the individual with environmental factors, such as what information the learner wants, what reinforcement is needed, and what sequence of stimuli is meaningful to the individual. Frymier defines the classification system as "a way of collecting, organizing, retrieving, and using curriculum materials that have been classified in terms of individual learning differences and personal learning needs" (1977, p. 27).

The system serves to characterize the learner and the curriculum materials on a high-to-low continuum in ten dimensions. The dimensions are experience, intelligence, motivation, emotion-personality, creativity, social skills, verbal facility, auditory skills, visual skills, and motor skills. The theory behind the perceptual dimensions is that instructors assess the curriculum materials and select those best suited for each learner. For younger learners the instructor may consider their low ranking in some of the dimensions in order to help develop the learning profile. The learner who is placed in the middle of the developmental process needs a combination of high and low-dimension instruction. For older learners the instructor may tend to address their perceptual strengths for reinforcement purposes (Frymier, 1977).

Principles from the ACCS that may be considered in future studies are a system for classification of classroom resources to "match" individual learners, individual classification based on perceptual modality, and resulting classification

that provides both high and low dimensions of the resource to allow for instructor choice of specific learner application.

LEARNING STYLES

Perceptual Style History

Throughout learning style history, perceptual learning styles have been classified under different names and incorporated differently in a variety of learning style models. One theory states that styles may be categorized as either processing systems or as input/output factors. An input/output factor is defined as perceptual or environmental preferences for receiving and delivering information (Davis & Schwimmer, 1981). Sometimes called learning style, cognitive style (information processing), and perceptual modality, the concept of learning through the senses was first researched by Lowenfeld (1939). His work dealt primarily with blind or visually-impaired learners, and studies were conducted to test visual and haptic modes in learning.

Witkin's Embedded Figures Test (Oltman, Raskin & Witkin, 1971), sometimes classified as an information-processing, learning-style test, was a performance-based instrument for learner perception in matching designs. He was best known for the field-dependent, field-independent theory based on learner focus and how an item's background was perceived. Witkin's performance test was an indicator of actual learning style, which is different from a perceived learning

style determined by a self-report instrument. Self-report tests became popular in the 1970s as a time-effective way to test several learners simultaneously. When comparing actual and perceived styles, a low correlation exists between perceptual subscales (Coolidge-Parker, 1989/1990; James & Blank, 1993).

Dunn and Dunn in the 1970s began using self-report or perceived learning style tests--Learning Style Inventory (LSI) and Productivity Environmental Preference Survey (PEPS)--to measure perceptual styles among four other style indicators. During the early 1980s, Barbe and Milone developed a perceptually-based, self-report checklist for learning style that teachers used to evaluate themselves as compared to learners.

French conceived the Learning Style Framework during this same period, and research to develop the MMPALT II was conducted by Gilley (1975/1976) and Cherry (1981/1982). The MMPALT II is a performance-based test to measure actual perceptual modality learning style. Another perceptual learning style theory and instrument was developed by Barbe and Swassing (1979), which was performance-based and tested learner recall in three modalities: visual, aural, and kinesthetic. These three modalities are the most commonly acknowledged when referring to perceptual styles.

An instrument also developed in the 1970s was Edmonds Learning Styles Identification Exercise (ELSIE), which placed strong emphasis on language and tests four perceptual learning modes (Grady, 1992/1993). Perceptual learning theories were also incorporated into the Learning Style Profile, a mixed-format

survey based on the National Association of Secondary School Principals' (NASSP) Learning Style Model developed in the early 1980s (Keefe, 1988). The model includes perceptual learning modes as part of the cognitive or information processing domain.

Other perceptual and cognitive style learning theories with the accompanying self-report testing instruments are Canfield's Learning Styles Inventory, Hill's Cognitive Style Mapping, and Babich and Randol's Center for Innovative Experiences (CITE) Learning Styles Instrument (James & Blank, 1993). Recently, the theories of Gardner (1993) for multiple intelligences have served as an expanded learning style theory that is linked to perceptual elements.

Findings of actual perceptual style indicators revealed most learners were visual with haptic learners as the second most common style (Lowenfeld, 1939; Cherry, 1981/1982). Another researcher found the interactive and visual styles to be most prevalent (Schaiper & Flores, 1985). Most recently, James and Blank (1991b) found the most common perceptual modalities to be visual, interactive, and haptic.

Key principles from the perceptual learning styles literature that may be used as a foundation for future studies include the identification and past research of perceptual learning styles, the theory of measuring actual learning style and perceptual elements by use of the performance-based MMPALT II, and the concept that adult learners exhibit strength in specific perceptual elements.

Multiple Intelligences

Learning styles are individual modes of accessing new information. In Gardner's Frames of Mind (1983), these "gifts" for learning are arranged into seven "intelligences." He explains the concept by saying,

There is persuasive evidence of the existence of several relatively autonomous human intellectual competencies, abbreviated hereafter as "human intelligences." These are the "frames of mind" of my title. But the conviction that there exist at least some intelligences, that these are relatively independent of one another, and that they can be fashioned and combined in a multiplicity of adaptive ways by individuals and cultures, seems to me to be increasingly difficult to deny. (p. 9)

Gardner's seven intelligences refer to higher domains of learning, but the link to perceptual mode processing reflects harmony with the seven perceptual modality elements in French's Learning Style Conceptual Model. The Gardner intelligences are linguistic, musical, math, spatial, bodily-kinesthetic, personal, and interpersonal. Linguistic learners use auditory and oral perceptual modes. Musical gifts are centered around pitch or melody, rhythm, and timbre. Links exist between the musical intelligence and body language as well as between spatial and personal intelligences. Links between the music and math spheres date back to Pythagoras. The math intelligence can be associated with the handling of objects and is linked to science. Spatial intelligence is characterized by outstanding visual memory and visual imagination, though it should not be limited to visual connotation. Bodily-kinesthetic intelligence keys are control of one's bodily motions and the ability to handle objects with skill. Personal intelligence has as its core the capacity to access one's own feelings, such as one's

range of emotions, to ultimately guide one's behavior. Interpersonal intelligence gifts rest in the ability to detect the moods of others based on a biological base (Gardner, 1983). Differences in the multiple intelligence theory and the perceptual modality constructs are recognized in the area of personal intelligence. The other six intelligences are linked to the senses, but the personal description does not indicate observable sensory applications.

In further explanation, Gardner (1991) underlined how different students learn through their different intelligences, thus making it necessary to teach to the learning modes of each learner. He explained that currently our system limits the modes of instruction:

Indeed, as currently constituted, our education system is heavily biased toward linguistic modes of instruction and assessment and, to a somewhat lesser degree, toward logical-quantitative modes as well. I argue that a contrasting set of assumptions is more likely to be educationally effective. Students learn in ways that are identifiably distinctive. The broad spectrum of students--and perhaps the society as a whole--would be better served if disciplines could be presented in a number of ways and learning could be assessed through a variety of means. (p. 12)

Gardner (1991) stressed the importance of getting past the traditional instructional approaches that focus on only two intelligences:

Until now, most schools in most cultures have stressed a certain combination of linguistic and logical intelligences. Beyond question that combination is important for mastering the agenda of school, but we have gone too far in ignoring the other intelligences. By minimizing the importance of other intelligence within and outside of schools, we consign many students who fail to exhibit the "proper" blend to the belief that they are stupid, and we do not take advantage of ways in which multiple intelligences can be exploited to further the goals of school and the broader culture. As I have argued in many writings . . . an education built on multiple intelligences can be more effective than one built on just two

intelligences. It can develop a broader range of talents, and it can make the standard curriculum accessible to a wider range of students. (p. 81)

Instructional activities designed to reach learners in the seven intelligences are formatted for units of instruction or for daily application in the classroom. The activities are designed for instructors to promote seven ways of learning. They address perceptual modes in an outline similar to the MMPALT II perceptual elements (Armstrong, 1994; Lazear, 1991). Dryden and Vos (1994) outline specific instructional formats for each of the seven intelligences and propose traits of the learner that help to identify the learner's style. They recommend activities such as "mind maps" that combine perceptual learning modes and introduce color for a faster learning rate and longer retention.

Two principles drawn from the multiple intelligence theory for support of the study include ideas that seven intelligences represent a higher domain that is linked to the senses as are the elements of the MMPALT II and that an individual instructional approach is advocated to address all seven intelligences.

Matching Instruction to Style

The core of effective instruction for the individual is matching instruction to the learning style. Ferrell (1988) observed,

Two things have become apparent about learning style from research in the field: individual differences in learning style do exist; and, when efforts are made to match an individual's learning style with an instructional environment, the outcomes of learning are positively affected. (p. 35)

The instructional environment may be created with the instructional activities and the instructor's style. French (1979) observed the relationship between instructor style and learner style by saying,

One way of responding to the question of individual differences is to suggest that every human being has a personal learning style. If this is true, it may mean that the survival of a learner . . . is directly related to the correlation between my teaching strategies and his learning style. Obviously, some conceptual model of learning styles is essential to the teacher engaged in instructional planning and implementation. (p. 11)

Research shows that instructors tend to teach using the style by which they learn (Cross, 1976; Cornett, 1983). When an instructor learns visually, he/she will teach visually and will most effectively reach the visually-oriented learner (Cross, 1976). Cafferty (1980/1981) conducted a study in which grade-point averages of high school learners were evaluated based on the "match" or "mismatch" of learning style to teaching style. The findings show that the greater the degree of match between instructor and learner styles, the higher the grade-point average of the learner. Similar studies showed a strong interaction between learner and student perceptual modality strengths when comparing gains on standardized tests (Milone, Barbe & Swassing, 1981).

The environment created by the instructor or instructional format in today's classroom is homogeneous or well suited for one type of learner and not homogeneous for another type of learner. Learning styles associated with the Jung theory of personality types identify four types that center around "intuitive" and "sensing" characteristics. Reckinger (1980) found that the action-oriented

learner, the sensing-perceiver (SP), made up 38% of the learner population. Teachers who were the sensing-perceiving type, however, made up only 2% of the teaching population with the majority in the elementary grades. These learning types, based on the Jung temperament theory, showed that in 1974, of the 671 National Merit Scholarship finalists, 17% were sensors, and 83% were intuitors. Conversely, of the adults who did not finish high school, 99% were sensors, and .4% were intuitors. In addition, a Florida twelfth-grade reading study showed that scores were higher for intuitive learners (Hanson, 1987). These intuitors, in perceptual terms, are most like the print learners in their success pattern for the school-based environment. In recent research comparing the Jung-based, Myers-Briggs Type Indicator (MBTI) styles with the Multi-Modal Paired Associates Learning Test, Revised, the print learners (MMPALT-II) scored significantly higher as intuitive types rather than sensors (MBTI) (Ryder, 1992).

Where there is a "mismatch" of learner and instructor styles, negative reactions may result for both groups. The learner may experience rebellion and confusion which can result in inappropriate behavior (Jacobsen, 1988). The instructor views the "mismatched" student as a troublemaker who causes classroom problems. "Matching" the instructor style to the learner style results in increased achievement, better attitudes, and a decrease in discipline problems (Dunn, 1990; Jenkins, 1988).

The matching of learner styles to instructor styles is equally important from a perceptual modality perspective. The perceptual modality learning concept

provides learners with sensory experience. In one example Carbo (1980) found that kindergartners learned more words and retained them longer when they were introduced in their strongest perceptual mode. Visual perception is not just a collector of information; rather it lays the foundation for concept formation. Arnheim (1969) commented on the collaboration of perceptual input and thinking: "I shall suggest that only because perception gathers types of things, that is, concepts, can perceptual material be used for thought; and inversely, that unless the stuff of the senses remains present the mind has nothing to think with" (p. 1).

Matching instruction to style has implications for instructional activity development based on theories and research that learner style match to instructor teaching style means enhanced learning, and that a mismatch means lost learning opportunities.

Neuro-Linguistic Programming

Neural patterns are linked to perceptual learning styles both in eye movement and in speech patterns (Dryden & Vos, 1994). Hanson (1987) explained his research findings on neuro-linguistic programming and eye movement:

While there are many sensory-diagnostic components to neuro-linguistic programming, and some 40 discrete types of interventions, essentially one's style boils down to the patterns exemplified by the favored use of certain neural patterns. These patterns are observable by tracing eye movement, listening for predicates, and through any one or more of the intervention strategies. Predicate patterns indicate seeing, hearing or touch, and through synesthesia patterns which visually duplicate the predicate patterns Each pattern shows a set of modality preferences in a dominant and

confirming mode. The eye positions are directionally up for visual dependency, lateral for auditory dependency, and downward right for kinesthetic/affect dependency Additionally centered eye movements down reflect gustatory recall, and centered eye movements up reflect smell. (pp. 227-229)

Seeking to evaluate student learning styles for best classroom applications can include not only eye movements but speech patterns that reflect the learner's perceptual modality. Keefe asked, "are his word associations and speech patterns more visual (uses of imagery), aural (verbally articulate), or behavioral (action-oriented)?" (Keefe, 1987, p. 42). Instructors may establish rapport and open communication channels simply by listening to individual student's use of predicates and by using that perceptual mode of predicate in responding (or in giving instructional directions) (Grinder & Bandler, 1976; Schmedlen, McCormick & Woldt, 1987; Robbins, 1986).

Studies from the psychotherapy field also encourage the use of similar perceptual predicates when effective communication and trust are important. Psychotherapists Grinder and Bandler (1976) explain the link to perceptual modes and language in this way:

There are three major input channels by which we, as human beings, receive information about the world around us--vision, audition, and kinesthetics (body sensations). (The remaining two most commonly accepted sensory input channels--smell and taste--are, apparently, little utilized ways of gaining information about the world) For our purposes at this point, we need only point out that information received through one of the input channels may be stored or represented in a map or model which is different from that channel. Perhaps the most frequently occurring example of this is the ability that each of us has to represent visual information, say, in the form of natural language--this is, words, phrases, and sentences of our language. (p. 5)

Instructors may use this perceptual-language link to open communication patterns within the learning environment. Grinder and Bandler (1976) proclaim, "By consciously selecting your predicates to match those of the person with whom you want to communicate, you will succeed in accomplishing clearer and more direct communications" (p. 15).

Key principles from neuro-linguistic programming may be applied in the classroom: learner eye-movement patterns and learner use of predicates as a resource for determining perceptual modality instructional methods appropriate for individual learners; and utilization of matched predicates in communication with learners during instruction to provide clarity and rapport.

INSTRUCTIONAL ACTIVITIES

Strategies

In any classroom where learners are gathered, a diversity of styles will be represented. As instructors meet this diversity, it is important to have variety in instructional methods and offer optional learning approaches for particular tasks. The emphasis is on individual options (Guild & Garger, 1985). Milone (1981) advocates presenting instruction initially using one or two learning styles dominant for the class and then at a "point of intervention" encouraging students to use their own modality strength to reinforce the learning. This individualized instruction by perceptual choice is advocated by French, the conceiver of the

MMPALT II theory. Jenkins (1988) also maintains the philosophy of levels or phases of instruction in allowing learners to access information through their own styles.

Hart (1983), like Milone, emphasized learner participation in instructional choices. He advocated brain-based instructional strategies in which learning is centered around the brain's nature and mode of operation. He introduced the Proster Theory, which is based on repeated observations of how learners behave and how this theory is linked with what we know about the nature of the human brain. Hart maintained that a theory of instruction must be based on a theory of learning and that learning theory overlaps with theory of behavior. Placing the student in an active role breaks the instructional tradition of "aggressive teaching" and encourages more active learner participation.

Components of individualized instructional activities that emphasize more learner participation include topics such as room design, small-group instruction, contract activity packages, programmed instruction, multi-sensory learning packages, and kinesthetic resources. Additional components are contract learning, team learning, simulations, role play, brainstorming, case studies, and student involvement (Dunn & Dunn, 1972, 1978).

Another strategic concept is in the multi-media approach in learning centers, contract learning, and learning activity packages where learners have a choice about what and how they learn. The instructional content should be appropriate to learning mode and ability level. The learner becomes responsible

for his or her own structure and competency attainment (Dunn & Dunn, 1972, 1978; Ward & Williams, 1976).

Strategy concepts related to the study are using variety in instruction with a multi-media approach and using several resources, maintaining the student as an active participant in the learning process, and using instructional methods appropriate to the individual learner.

Relating Activities to the Senses

With the perceptual modes as sensory input channels for information, activities that specifically address a variety of senses are desirable. Basic information about each human sense can help in understanding the "activity-perceptual sense" relationship.

Ackerman (1992) explained the body's combination of receptors or input systems and the link in learning to the brain's chemical messengers, the neurotransmitter. He acclaimed our systems of perception, our senses, as not just a physical link in learning but a pathway for information that shapes the realm of subjective experience. Joseph (1993) continued the discussion by tracing brain function in learning through chemical neurotransmitter, axon nerve fibers, dendrite branching fibers, and nerve junction synapses. He related languages of the body in perception to languages of the brain.

According to Wolf, 70% of the body's receptors are in the eyes (Ackerman, 1990). The mental processing of vision is complex. The eye and brain must work

together to break up a visual picture into aspects of color, form, motion, and depth, with each being processed in a different part of the brain (Grady, D., 1993). Because most people are visual learners (James & Blank, 1991b), the emphasis on visual activities is paramount.

The auditory nerve cells can pick up frequencies between 16,000 and 20,000 cycles per second, almost ten octaves, beautifully. The principal frequencies of the human voice are between 100 and 150 cycles per second. Music, as part of the auditory mode, is a learning accelerator. Bass (1985) found that music had positive results on short-term memory enhancement. Aside from hearing being a perceptual learning channel, the factor of level of sound is significant in long-term retention. Psychologist Bronzaft found "in a study of pupils in grades 2-6, at PS 98, a grade school in Manhattan, . . . that children assigned classrooms in the half of the building facing the elevated train tracks were eleven months behind in reading by their sixth year, compared to those on the quieter side of the building" (Ackerman, 1990, p. 187).

Taste is rarely used in instructional activities because of the nature of the traditional environment, yet smell and taste, both essential to our survival, work in harmony to produce taste. Adults have 10,000 taste buds (grouped by salty, sour, sweet, bitter), and because they are replaced every ten days, the opportunities for new associations and new learning become a continuous process (Ackerman, 1990).

Smell was the first of our senses because the brain literally grows from the stem where the olfactory bulb is located (Joseph, 1993). The human nose can detect 10,000 different odors, and smell is the only sense that we cannot eliminate completely (Ackerman, 1990). An article in The Chronicle of Higher Education reported that "related tests at the University of Cincinnati have shown how fragrances added to the atmosphere of a room can increase typing speed and work efficiency in general" (Ackerman, 1990, p. 57).

Touch is the most difficult sense to research. It is a sensory system rather than one isolated organ. The sense of touch opens receptors to learning channels as well as improved human communication and rapport. A Purdue University study showed that students who identified "subconscious" touch by the library personnel also reported much more satisfaction with the library (Ackerman, 1990). Neuroscientist Ramachandran explained the touch and stimulation sequence:

When endings in the skin, known as receptors, receive a stimulus--a brush of silk or the prick of a needle, . . . the bioelectrical impulse generated by the receptors travels through the spinal cord to connections called synapses in the brain stem . . . the more receptors active in an area of skin, the bigger its allotment of sensory cortex. (In us humans, nearly a quarter of the skin cortex is dedicated to our highly sensitive hands). (Shreeve, 1993, p. 36)

Instructional activities that specifically address the senses, including the sense of touch, were introduced by Orton and Gillingham after research in reading and language disabilities began in 1928. The multi-sensory instructional techniques were first designed for teaching language arts and then for dyslexic learners. The Slingerland adaptation of the Orton-Gillingham theory is an

instructional technique for teaching language arts. This approach involves teaching auditory, visual, and kinesthetic modalities simultaneously. Results have shown the Slingerland method to be more effective in terms of retention than the traditional instructional method (Gillingham & Stillman, 1956; Royal, 1987; White, 1989). Other effective instructional methods drawn on the Orton-Gillingham principles of multi-sensory instruction include the Spalding Method (Sielaff, 1994) and the Literary Program offered through the Texas Scottish Rite Hospital (Dyess, 1994).

Guiding principles from sense-related activities may be applied to current instructional activities: the senses provide a sensitive input system which is easily tapped during instruction; sensory learning can provide means for excelled learning; and multi-sensory methods of instructional are effective.

Environment and Learning

The case for enriched environments has been the lifelong research of Diamond, professor of neuroanatomy. After a thirty-year study of animals in enriched environments versus impoverished environments, she found a connection to the nervous system:

With increasing amounts of environmental enrichment we see brains that are larger and heavier, with increased dendritic branching. That means those nerve cells can communicate better with each other. With the enriched environments we also get more support cells because the nerve cells are getting bigger. Not only that, but the junction between the cells--the synapse--also increases its dimensions. These are highly significant effects of differential experience. It certainly shows how dynamic the

nervous system is and how responsive it is to its internal and external surroundings. (Healy, 1990, p. 47)

The connection between environment, the nervous system, and intelligence also underlines the need for perceptual learning experiences to produce growth.

Healy (1990) described Diamond's research, which shows that

rats in an "enriched" environment, actively interested and challenged by frequent new learning experiences, develop larger and heavier brains and also show increased ability to run mazes, the best available test of a rat's intelligence. Moreover, in a series of recent experiments, she (Diamond) has demonstrated for the first time that the effects of personal involvement in new learning appear to be so powerful that rats of any age can develop new brain connections if they intensely pursue new challenges. (p. 48)

Klivington maintained that structure and function of the brain are inseparable: "We know that environments shape brains; all sorts of experiments have demonstrated that it happens. There are some studies currently being done that show profound differences in the structure of the brain depending on what is taken in by the senses" (Healy, 1990, p. 51).

The link of individual learning to environmental influences is confirmed by research. According to Diamond, "Whatever word may be most effective in getting people to realize that not all children learn in the same way, it is clear that environments play an important role in these differences" (Healy, 1990, p. 58). Enrichment in the enriched-environment research consists of cognitively stimulating toys, companionship, physical participation, and comfortable space (Healy, 1990).

By neglecting the learning environment, educators limit perceptual, enriching activities and may cause decreased growth in learning abilities. In comparing a sensory-stimulating environment with decreased stimulation, Diamond (1988) noted,

Just as the cortical neurons become larger in a stimulating environment, they decrease in size when there is less input from the millions of sensory receptors reporting from the body surface and the internal organs. It is just as important to stress the fact that decreased stimulation will diminish a nerve cell's dendrites as it is to stress that increased stimulation will enlarge the dendritic tree. (p. 156)

Diamond (1988) has shown that enriched environment benefits are applicable to all ages. She states, "perhaps the single most valuable piece of information learned from all our studies is that structural differences can be detected in the cerebral cortices of animals exposed at any age to different levels of stimulation in the environment" (p. 157).

The enriched environment studies were especially significant for visual learners. Diamond summarized sensory dominance: "While all sensory input facilitates learning, the visual association cortex was the first to be responsive to enrichment in our experiments" (Diamond, 1988, p. 162). The enrichment studies underline the importance of individual, sensory stimulation. According to Diamond, a key consideration in learning is that passive observation is not enough; the learner must interact with the environment.

Music as an environmental influence and as one of Gardner's multiple intelligences should be considered as a part of instructional activity (Dryden &

Vos, 1994). In a recent study at the Center for the Neurobiology of Learning and Memory at the University of California, researchers found that "there are correlational, historical, and anecdotal relationships between music cognition and other higher brain functions" (Rauscher, Shaw & Ky, 1993, p. 611). The study showed that listening to Mozart ten minutes prior to taking the Stanford-Binet Intelligence Test raised the intelligence scores an average of nine points over the scores of those not listening to the music (Rauscher, et al., 1993).

More evidence of the power of sensory learning activities was shown by Cochran and Nelson from Utah, who invented a tape of ocean sounds used to increase the reading speed of learners. It established a varying rhythm that helped readers break the natural habit of sounding out the words on the page (Andrews, 1991).

The environment affects learning and influences instruction in the following ways: individual learning is related to the senses that are stimulated by the environment, thus raising intelligence. This increased capacity for learning is possible at any age, and the neglect of environment, conversely, will decrease learning stimulation. The visual sense and interaction with the environment are important components for learning. Music and rhythm, both sensory-related, provide higher brain function in learning.

Group Instruction

Group instruction is an effective instructional method. It incorporates participatory and social aspects of learning. The idea of group instruction is to connect concepts that are based on different approaches to education.

The interaction element of French's perceptual modality framework reflects the discussion common to cooperative groups and other enhanced learning group efforts. Slavin (1992) described this kind of cooperative learning: "For certain kinds of learning, discussion under cooperative conditions may improve subsequent individual achievement. For example, discussion of text improves student recall of the text content more than reviewing the text alone" (p. 152). Joyce agreed by saying that "student scores are up ten percent when students are provided with opportunities to learn collaboratively" (Joyce & Weil, 1972, p. 245).

A recent trend in educational systems has been the cooperative learning concept. French (1975c) encouraged the method as an effective strategy for individualized instruction because it allows learners to access the instruction through their own learning modality. Talmage contends, "the concept of individualized instruction does not, of course, eliminate the possibility that learning can take place in groups. Many grouping patterns are congenial to the concept of individualized instruction" (Talmage, 1975). Slavin summarized the cooperative instructional method as an alternative to traditional instruction. The cooperative method uses cooperative task structure, incentive structure, and rewards or collective grades (Slavin, 1983).

Several methods and philosophies of cooperative learning exist, but what unites them is their application to achieve cognitive as well as non-cognitive objectives in a classroom. Cooperation refers to cooperative behavior in which a group is rewarded based on the performance of all members. Cooperation has proved to be more efficient than competition. Interpersonal relations hold a key to the experience that individuals are liked and feel valuable to the group. In experiments the cooperative learning groups score significantly higher in achievement than the control group (Slavin, 1983).

Principles of group instruction that apply to instructional activity development are the benefits of participation and social aspects of learning, and the use of interaction and discussion processes in groups to improve recall. An additional principle is the need for collaborative and cooperative learning processes, rather than competition, to improve retention.

RELATED RESEARCH

The Multi-Modal Paired Associates Learning Test, Revised (MMPALT II)

Different learning style theories may vary over time in popularity and modality, but perceptual traits are consistently present in all learners. Perceptual modality learning styles research began when Lowenfeld (1939) conducted studies to test visual and haptic modes of learning. Different theories address different perceptual modes ranging from Lowenfeld's two modes up to the seven modes

theorized by French (1975a). The seven elements of the perceptual modality concept used in this study were first identified by French (1975a, 1975b) and then measured by Gilley (1975/1976), who tested third graders. The initial measurement instrument, the Multi-Modal Paired Associates Learning Test (MMPALT), was refined and adapted by Cherry (1981/1982) to include the olfactory element. Today the revised measure, MMPALT II, is used to identify the strengths of learners in each of the seven perceptual styles. The styles are print, aural, interactive, visual, haptic, kinesthetic, and olfactory (Cherry, 1981/1982; French 1975a, 1975b; James & Galbraith, 1985; Schaiper 1983/1984).

Research in perceptual modality learning styles using the MMPALT II has compared actual style to perceived style and has determined dominant styles for learners with a variety of ages and occupations. Results show no significant relationship between perceived learning style measured with a self-report instrument and actual learning style measured with a performance test (Akins, 1983/1984; Brown 1984/1985; Cherry, 1981/1982; Coolidge-Parker, 1989/1990; James & Galbraith, 1985; Lucas, 1985; Nix, 1983/1984; Rice, 1984/1985; Russell, 1984/1985; and Schaiper, 1983/1984). The results are based on comparisons using the MMPALT II, Perceptual Modality Preference Survey (PMPS), Productivity Environmental Preference Survey (PEPS), and the Perceptual Learning Style Inventory. Based on MMPALT II research, the most prevalent perceptual learning style element is visual, and collectively the second most prevalent learning

style elements are haptic and interactive. The lowest ranking element is olfactory (James & Blank, 1991b).

Additional research compares the MMPALT II learning styles of adult high school graduates and nongraduates with graduates scoring significantly higher on five out of seven element subtests. Research using perceptual modalities shows that "in all cases, graduates scored higher than nongraduates, suggesting that dropouts might be less able to learn from the more common print and aural-oriented teaching methods typically used in schools" (James & Blank, 1991a, p. 98). An experiment using print and aural instructional methods matched and mismatched the learners' perceptual style while using a pre-test, post-test comparison measure. The mean change in scores in the high print and high aural groups were significantly higher than in the low print and low aural groups, indicating that high print and aural learners can learn regardless of instructional match or mismatch to their perceptual learning style.

Principles from the MMPALT II's development and use may be applied in classroom instruction. Specific learning styles are best addressed by a wide variety of perceptual modes; a measurement of actual learning styles provides a base for the proposed perceptual framework; elements identified in order of predominant learner style may be used in the study; and traditional instructional methods emphasize print and aural learning styles.

The Delphi Technique

The Delphi Technique grew out of a defense research project, Project Delphi, in the 1950s and was an Air Force-sponsored Rand Corporation study. The original study was designed to obtain a consensus of opinion from selected experts on an estimation of A-bombs required to reduce munitions of a United States industrial target system. No information was available on the topic, and it was out of reach of the computer systems at that time (Linstone & Turoff, 1975). This goal was achieved by a series of questionnaires and a system of controlled feedback. The original researchers for Project Delphi explained that it was a system "devised in order to obtain the most reliable opinion consensus of a group of experts by subjecting them to a series of questionnaires in-depth interspersed with controlled opinion feedback" (Dalkey & Helmer, 1963, p. 458).

The Delphi Technique currently continues as a method for formatting a communication process that allows for individuals, as part of a group, to deal with a complex problem. The Delphi method has diverse applications, such as gathering historical data, establishing priorities for goals, producing budgets, and developing the structure of a model (Sackman, 1975). It is commonly used as a forecasting technique and as a tool in developmental studies (Gordon & Helmer, 1964). The Delphi process has three features: anonymity, controlled feedback, and statistical group response (Dalkey, 1969). Phases of the Delphi process include exploring the subject with individual member contribution, viewing how other Delphi members evaluate the issue, exploring reasons for any disagreement

on the issue, and completing a final evaluation of the issue. This discussion process continues until consensus is reached as determined by the director (Sackman, 1975). Authorities on the Delphi Technique concur that "the process stops when consensus has been approached among participants (Helmer, 1967) or when sufficient information exchange has been obtained" (Delbecq, Van de Ven & Gustafson, 1975, p. 83).

The conventional Delphi is known as a pen-and-paper exercise using a questionnaire in which results are summarized and the respondent group is given at least one opportunity to re-evaluate the original answers based on comments or ratings of other participants (Linstone & Turoff, 1975). The original study combined panel member interviews with the written responses (Dalkey & Helmer, 1963). In the final process a ranking or rating method is used, and the group decision is reached by a mathematical decision (Delbecq, et al., 1975). The number of rounds is dependent on several factors, but Martino states that there is no advantage to going more than two rounds (Martino, 1972). The conventional Delphi includes the following characteristics:

1. The Delphi group may be composed of experts or subjects informed to a greater extent about the issue, but who do not qualify as experts;
2. The format is typically a questionnaire often administered by mail;
3. The questionnaire items may be generated by the researcher, the Delphi group, or both;
4. Guidelines are included with the questionnaire;

5. The questionnaire is administered in two or more rounds or probes;
6. Each round includes a form of statistical feedback to the participants (excluding the initial contact);
7. Each round may or may not include written comments from other participants for consideration;
8. Individual participant responses are kept anonymous;
9. Types of feedback continue until a consensus is reached at a point determined by the researcher;
10. Participants do not meet and discuss issues during the questionnaire sequence (Sackman, 1975).

The reliability of the Delphi Technique was addressed in an evaluation by Ludow (1975). In the evaluation the Sea Grant Delphi exercises were used to test the hypothesis that the distributions of judgments and the means of those judgments were homogeneous across three groups of panelists. Using group statistical summaries, the reliability of the method was similar for the three panelist groups.

Reliability of Delphi studies was statistically calculated when using ordinal or nominal data and is often associated with ranking or Likert-type scales (Linstone & Turoff, 1975). An early test by Dalkey (1969) concerning questionnaire reliability involved a split-half comparison with resulting coefficients ranging from .4 to .6. The reliability of the Delphi questionnaire and the stability of results were questioned by Sackman (1975). He maintained that the

questionnaire process should be replicated on an independent panel and results compared for reliability over time.

Validity relating to the Delphi process is critically reported by Sackman (1975), but his remarks are refuted by Coates (1975) and Linstone (1975). According to Sackman, panel opinion for prediction was used with little comparison to actual resulting events. To determine content validity, it is necessary to use a systematic sampling of elements of the inquiry area, a step rarely practiced. Sackman's objections to the Delphi process center around the predictive nature of the study of opinions and around standards identified by the American Psychological Association for tests.

The Delphi Technique was selected for use because of the developmental nature of the study. Procedures for the panel of experts were drawn from the literature based on the Delphi Technique.

SUMMARY OF REVIEW OF LITERATURE

In summary, individualized instructional theories and individual learner differences are central to the issue of an improved educational "product." The individual learner would be better served by adapting curriculum to meet learner needs and amending traditional classroom instructional formats for the individualized application. One example of individualized instruction is use of a

system for classifying instructional materials. The system sets the framework for classification of instructional activities for individual learners.

Learning styles based on perceptual modality elements in the MMPALT II are used to determine learner strengths. The most common learner strength determined by performance-based instruments for actual individual learning style evaluation show that visual learners are most dominant among adults. Sensory modes are also used for input of information in the theory of multiple intelligences, which is considered a higher domain of learning styles. By matching the instructional strategy to the learning style of the learner, enhanced learning results. Communicating effectively with learners, important to enhanced learning, may be exemplified by use of neuro-linguistic programming techniques, which are based on the learner's perceptual modality.

Instructional activities are best suited to individual learners by using a variety of strategies, multi-media instruction, and active participation of the learner. Individualized instructional activities that appeal to the senses may be used to provide accelerated learning by stimulating the sensory system and using multi-sensory experiences. The environment in learning is a neural link to higher intelligence that provides enriched opportunities for brain growth with learner interaction and visual stimulation as central themes. Music and group instruction as part of the environment provide interactive and cooperative learning settings that benefit the learning process.

Related research in the literature includes the development of the MMPALT II and perceptual mode research resulting from its use. Perceptual modality elements of the MMPALT II--print, aural, interactive, visual, haptic, kinesthetic, and olfactory--make up the classification structure for instructional activities used in the study. The Delphi Technique was selected for the study because of its developmental nature and because the topic could best be studied by developing a consensus of expert opinion. Format for the Delphi process was drawn from the literature for applied use in the study.

CHAPTER 3

METHODS AND PROCEDURES

The purpose of the study was to provide information useful for Marketing Education instructors in applying effective perceptual modality instructional techniques. The process of this two-phase study is outlined by sequence (Appendix A). The study reflects the opinions of Tennessee Marketing Education instructors as well as a Delphi panel of experts on the elements of perceptual modality exclusive to the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II). It is projected that information from this study will serve as a foundation for curriculum and instructional development in Marketing Education.

PHASE I- INSTRUCTOR SURVEY

Population

The total population of 138 Marketing Education instructors in Tennessee was surveyed to evaluate the effectiveness of instructional activities drawn from the Tennessee Curriculum Guide for Marketing Education. Using a two-page questionnaire, (Appendix B), instructors evaluated the activities while attending the regional Marketing Education meetings held throughout the state during January and February 1994. The regional meetings were held at East Tennessee

State University, the University of Tennessee at Knoxville, Middle Tennessee State University, the University of Tennessee at Martin, and University of Memphis (formerly Memphis State University). The regional meeting records show that a total of 119 Marketing Education instructors were in attendance.

Survey Instrumentation

The questionnaire was developed by the researcher based on instructional activities drawn from the Tennessee Curriculum Guide for Marketing Education developed in 1989 and used during the 1993-94 school year. All units of the guide were reviewed, and all activities were reflected in the base activities used for the study. The instrument used to gather data, the Survey of Effective Instructional Activities for Tennessee Marketing Education Instructors, is included in Appendix B. The survey was evaluated by an advising team of education professionals (Appendix C) for clarity and thoroughness prior to its use.

A pilot study was conducted using a stratified random sample drawn from the five state regions. Two teachers were selected from Regions II and IV. Three teachers were selected from Regions I and V, and five teachers were drawn for Region III. This process included five instructors from each of the state divisions of Tennessee, East, Middle, and West, for a total of 15 instructors. The number of pilot study teachers represented 11% of the total population, and the number of pilot study teachers for each region was proportionate to the size of the population of Marketing Education instructors for that region. Following the

random selection, teachers were contacted by telephone by the researcher, who explained the study and requested their consent to participate. The pilot study served to evaluate instrument clarity, to secure additional instructional activities, to process preliminary data resulting from the responses, and to serve in evaluating reliability. The first week in January 1994, participating pilot teachers were mailed an overview of the study, a questionnaire with return envelope, and a cover letter confirming their earlier agreement to participate in the pilot study. A follow-up of the teachers in the pilot group included postcard reminders and telephone calls producing a 100% response.

During the pilot study all instructors were encouraged to list any additional activities on the instrument in order to ensure that no activities used by the instructors would be omitted. The pilot study included 57 instructional activities. Pilot study participants listed additional activities on the questionnaire. The five additional activities identified by the instructors then became part of the population survey, resulting in a total of 62 instructional activities.

Reliability of the instrument was determined by test-retest correlation (Borg & Gall, 1989) using 13 of the 15 pilot-test teachers' surveys. Using Statistical Analysis System (SAS) computer statistical package, the comparison was .74. This figure, when compared to 1.0, is a reflection of the teachers' consistency in answering the same to both the pilot instrument and the survey instrument. Two questions on the survey showed low comparisons (.38 and .46) in the test-

retest analysis. When omitting the two questions, the new test-retest comparison was .78.

Following the pilot study the actual survey was conducted at the regional Marketing Education meetings where instructors could circle their opinion of the effectiveness of each activity: effective, not effective, or not applicable. The instructors were asked to base their judgments on their experience as Marketing Education classroom instructors. The instructors were also encouraged to list on the survey instrument additional activities they used, but no activities were recorded. Procedures for collecting survey data are outlined below.

Survey Data Collection

A letter briefly describing the research study and the projected time frame was sent to each Marketing Education instructor to request his/her participation. Next, permission to conduct the state-wide study was secured by telephone and by letter from the state advisor and regional Marketing Education teacher educators or area supervisors conducting the five regional meetings. During the regional Marketing Education meetings held in January and February, instructors in attendance were asked to complete the study questionnaire. The instructors heard a brief introduction to the study questionnaire, completed it at an appropriate time during the meeting day, and then returned it to a central location prior to the end of the meeting. The initial contact with the teachers resulted in 113 returned responses. Follow-up contact was made with instructors who did not

attend the regional meeting. A cover letter, questionnaire, and return envelope were mailed in February to these instructors with a requested deadline date. An additional four completed surveys were returned as a result of the follow-up to regional meeting non-attendees.

Special procedures were used for the return of the Region III questionnaires. The questionnaire could not be completed during the meeting time because of the meeting day format. Arrangements were made for an introductory explanation to the instructors, and then packets were given to each teacher in attendance at the Region III meeting. The packet included a cover letter, questionnaire, and return envelope. Instructors were asked to complete the instrument and mail it to the researcher. After two weeks a second mailing was sent as a reminder to the instructors in this region.

There were 117 respondents to the state-wide survey, representing an 85% return rate. A summary of instructor respondents by state region is recorded in Table 2. Region I had 100% participation, and Region III had the lowest percentage of returned surveys. Collectively, all regions were well represented with over 75% participation from each region.

Table 2

Regional Numbers and Percentages of Instructors Participating

Region	Instructors in Region	Instructors Participating	Percentage of Participants	Percentage of Total
1	27	27	100%	23.1%
2	24	20	84%	17.1%
3	35	27	77%	23.1%
4	24	21	84%	17.9%
5	28	22	79%	18.8%
	<u>138</u>	<u>117*</u>		<u>100%</u>

* 85% response rate

There were 21 non-respondents to the state-wide survey. After a second mailing, six instructors were contacted by telephone and agreed to complete the questionnaire orally or using their survey instrument. The results of the initial non-respondent group were received too late to be combined with the other participant data.

The researcher hosted a reception for all Marketing Education Instructors at the Tennessee Career Development Conference held in Nashville during March as thanks for their participation in the state-wide study.

Survey Data Analysis

Responses from the state-wide survey were compiled by frequency count and percentage for each of the 62 activities and the three choices: effective, not effective, and not applicable. The number of instructors marking each of the

three choices was compared to the total number of instructors responding to each activity. The resulting percentages were indicated for each instructional activity.

Responses from the initial non-respondents were compared to the population response to determine if their answers represented a bias to the study survey. A bias might influence their choice to not complete the initial survey. No bias was noted. Because of the lateness of the final responses, the non-respondent data were not combined with the population response.

PHASE II- DELPHI PANEL OF EXPERTS

Panel of Experts Selection

The experts for the Delphi panel were selected based on their knowledge of the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II). The first round for potential panel member selection required extensive research to locate past MMPALT (and MMPALT II) researchers. The process began in December 1993. Candidates were contacted by telephone or by mail, and some located through the universities from which they graduated. The candidates contacted initially responded with current name, address, job title, employer, dissertation title, and a list of published studies. These respondents were asked if they would like to participate in the study at one of two levels: as a Delphi panel of experts member or as an advisor to the study. From the information they provided, ten potential Delphi panel members were chosen for the second part of

the selection process, the interview. The researcher interviewed all potential members during February and March. Nine Delphi panel members were interviewed in person, and the one remaining member was interviewed by telephone. The ten Delphi panel members were selected in March based on their:

1. Knowledge of and experience with the Multi-Modal Paired Associates Learning Test (MMPALT or MMPALT II);
2. Understanding of the instructional processes used in secondary education;
3. Willingness to participate in the study.

The resulting panel included the individual who conceived the MMPALT theory and those doing the original research. The individual that had conducted and supervised the most research using the MMPALT II was also a panel participant. Included were individuals who had conducted research recently, and practitioners; one of whom had used the MMPALT II concept with both teachers and students within an entire school. A list of the Delphi panel of experts is included in Appendix C.

Pilot Study

A pilot panel was selected concurrently with the panel of experts. The system used for panel selection was also used in selecting the three pilot study members. The resulting panel was composed of individuals who had worked with the MMPALT II during their recent research studies. A list of the pilot study

members is included in Appendix C. Members of the pilot group completed a separate pilot study prior to each Delphi probe.

The pilot study for the Delphi-I was conducted in March to determine clarity of the study instrument, clarity of the study overview, time necessary to complete the Delphi-I, and analysis of results to ascertain any problem areas of the instrument. Members of the pilot study group were asked to complete the instrument and complete an evaluation sheet about the probe.

The objective of the Delphi-II pilot study, conducted in May, was to evaluate the clarity of the new instrument and the instructions for its completion, the approximate time for completion, and the undetermined issues that might delay or block the consensus process. Members of the group were asked to complete the instrument and an evaluation sheet regarding the Delphi-II. One change in the format of the instrument resulted from the pilot response.

The pilot for the Delphi-III, conducted in July, was used to evaluate the clarity of the instrument and the revised format of the Delphi-III. The pilot study members were asked to complete the third probe and provide an evaluation. Throughout the nine month process, the pilot study panel and the Delphi panel of experts provided a 100% response rate during the three probes for classification of instructional activities.

Delphi Instrumentation

The Delphi instrument was developed using the 62 instructional activities from Phase I of the study and the seven elements of the MMPALT II: print, aural, interactive, visual, haptic, kinesthetic, and olfactory. The Delphi panel of experts was asked to classify each of the activities according to elements derived from the MMPALT II perceptual modes. The elements were selected based on which of seven were most dominant and second most dominant for each activity. The classification of each activity was based on the perceptual element dominant or most commonly accessed by learners in that activity. The optional secondary element classification was dependent on the nature of the activity evaluated.

Following the development of the instrument, an advising team of education professions (Appendix C) evaluated the Delphi-I prior to the pilot study for the clarity of description of the instructional activities. Minor modifications were made in activity descriptions and format. In the first Delphi probe, panel members were provided an overview of the study, including objectives, Delphi Technique guidelines, study sequence, time schedule, original definitions of the perceptual modality elements (Cherry, 1981/1982; Gilley, 1975/1976), and the Delphi-I instrument.

The Delphi-I instrument, located in Appendix D, listed the instructional activities in the same order that they appeared on the state-wide Marketing Education instructor survey (Phase I). Examples or descriptions were given following the activities that needed clarification for an educator on the panel who

had not used instructional activities from the marketing curriculum. This additional information was given in brackets []. The members of the panel were to classify each activity and write comments justifying their choices. Activities considered multi-modal could be classified as "1" (dominant), "2" (second most dominant), and some panel members chose to include "3" (third most dominant).

The Delphi-II instrument was developed based on the responses of the panel to the Delphi-I instrument. It had the same format and included all activities listed on the Delphi-I with the same examples and descriptions but included additional information about some activities which had been requested by panel members. Data from the Delphi-I regarding activity classification by element was summarized in percentage and ratio form for each activity. Panelists' comments were listed for each activity, reflecting rationales for their classification choices.

Additions to the original instrument to provide information requested by panel members was denoted in double parenthesis (()) on the Delphi-II instrument. Members also requested that one activity (#7) be separated into two parts (#7a, #7b) to allow panelists to classify them separately. Each activity listed the percentage of panelists who selected each potentially dominant elemental classification and proportions for each potentially secondary elemental classification. No third-ranking classifications were recorded on the Delphi-II because never more than two panelists chose to classify the elements as third most dominant. The Delphi-II instrument is shown in Appendix E.

In modifying the instrument for the third probe, the instrument format was changed slightly to reflect the consensus classification for 58 of the instructional activities. On the Delphi-III instrument (Appendix F), all activities of one classification were grouped together so that panelists might evaluate the continuity of one classification collectively. The instrument showed the dominant classification, "1," optional secondary classification, "2," and comments made by the panelists for each activity. The third probe, or Delphi-III, also included additional information requested by a panelist for six of the activities, clarification of a few activities as to whether they were group or individual activities, and rewording to reflect the students' perspective rather than that of the instructor. Any additional information on this probe that did not appear on the Delphi-II is denoted with double brackets [[]]. The overview that accompanied the instrument included a summary of panelists' comments from telephone interviews conducted between the Delphi-II and the Delphi-III. The interview comments were grouped into issue headings: print versus haptic, visual versus print, multi-modal activities, group projects versus individual activities, and the order of perceptual learning element.

Delphi Data Collection

Delphi-I

The 62 instructional activities on the instructor survey (Phase I) were listed for Delphi panel members to classify according to perceptual modality based on the seven elements of the MMPALT II. The objective of the Delphi-I iteration

was to classify the instructional activities based on panelists' knowledge of the MMPALT II perceptual elements, the original definition of the elements, and the provided descriptions of the instructional activities. The Delphi-I probe, conducted in April, asked the panel to classify each activity as to the dominant element based on the MMPALT II perceptual framework and if the activity was multi-modal to classify it with a secondary element. Members also were encouraged to comment as to why they made element choices.

To compile the results of the Delphi-I, responses from the members were totaled and shown as percentages for first choices and as proportions for second choices. This format addressed the responses of the panelists who listed more than one "1" classification. Some members chose not to list a "2" or optional secondary choice because of the nature of the activity. Comments by the panelists were recorded exactly as written by the member unless space did not allow for lengthy quotes. In those cases, comments were summarized by the researcher and then reviewed for clarity and accuracy by comparing them to the original comments. The review was done by an advising team of education professionals. The team represented members knowledgeable about perceptual modality and the Delphi Technique. Additional information about the instructional activities was provided by the researcher on the next probe when requested by a panel member in the Delphi-I responses.

Delphi-II

Prior to the Delphi-II probe, the researcher hosted a luncheon to honor French, who originally conceived the theory that is the basis of the MMPALT. All researchers who had worked with the MMPALT or MMPALT II and whose names were identified by the earlier national search were invited to attend the luncheon at the University Faculty Club. This occasion provided an opportunity to share information on past research and project ideas for future research.

The objective of the Delphi-II probe, conducted in June, was to allow panelists to review the classification percentages and proportions of other members, to read the accompanying comments for each activity, and to re-evaluate the classifications. The Delphi-II panel re-evaluated the same instructional activities after studying the classifications and comments of other panel members. Additional comments were encouraged, especially if the panel member chose a different element from the majority's choice. Members were asked to use one "1" and one (optional) "2" for each activity. This format served to help panelists focus on the dominant senses addressed rather than listing all elements the activity might include. The Delphi-II included additional information about the activity requested by the panelists. All descriptive additions were critiqued by the advising team. This group, composed of education professionals, evaluated the instrument and activity descriptions for clarity and accuracy. To compile the responses from the Delphi-II, the dominant classification element was

expressed as a percentage, and the optional secondary classification was shown as a ratio.

Based on a review of Delphi studies, consensus was set at 70% agreement for dominant classification and a minimum of 40% agreement if two elements were selected by the panel as equally dominant perceptual modes. The acceptable dominant or "1" classification for a double dominant consensus would be 40% and 40%, 40% and 50%, or 40% and 60%. The secondary element classification was an optional choice by the panel members. A minimum of four panelists had to be in agreement with the "2" or secondary classification in order to constitute a consensus.

Several issues evolved as a result of the panelists' comments on the Delphi-II. Each panel member was contacted for a telephone interview to discuss the issue areas in order to better prepare for the final probe. Results of the interviews are summarized in the overview section sent to each panel member with the Delphi-III instrument. The issues' themes included haptic versus print classifications for written activities and visual versus print classifications for purposes of visualizing the finished print activity. Multi-modal activities were an issue in relation to how activities were accessed by the learner and in discussion about learning when the input element (presentation) and the retention element were paired. Group projects versus individual activities centered primarily around a discussion of teacher-directed modes of learning versus learner choice of mode. Another issue dealt with perceptual modes that were accessed by the learner first

versus dominant modes for the activity. A summary of the issue comments is included in Appendix F. Panelists were asked to read both the summary of issue comments from the interview and the comments made on the Delphi-II instrument before responding to the final Delphi probe.

Delphi-III

The objective of the Delphi-III was for panelists to view the instructional activities by element classification, to review the comments of the panelists, and to mark their level of acceptance of the consensus of the Delphi panel. During this August probe, the Delphi panel could review the responses and comments of other panel members to the Delphi-II instrument and a summary of interview comments regarding classification issues. Each activity had a dominant perceptual modality classification, denoted as "1" on the Delphi-III instrument. The secondary classification for multi-modal activities was indicated with a "2," denoting the second most dominant element classification. The panel members requested to see the third dominant classification for multi-modal instructional activities. The activities that were chosen by three panel members within one element classification, instead of the required four for secondary classification, were indicated with a "(3)". Panelists then rated their level of acceptance with the majority classification for the resulting 58 instructional activities, using a rating of high acceptance, moderate acceptance, low acceptance, or no acceptance for both the "1" and "2" elements. If the panelist chose "No Acceptance," he/she was asked

to comment on the choice. The five instructional activities that did not achieve the 70% consensus required during the Delphi-II were listed separately on the Delphi-III so that the panel could evaluate the activities again.

Delphi Data Analysis

The effort to maintain the flow of communication between the pilot study group and the researcher and the Delphi panel of experts and the researcher used marketing and management communication techniques which contributed to the continuity and excellent response rate. The Delphi-II probe resulted in 58 of the 63 instructional activities' being classified according to one or two of the seven perceptual modality elements. The remaining five activities were classified during the Delphi-III probe, which resulted in 100% dominant classification of instructional activities.

COMBINED STUDY RESULTS

Results of the Marketing Education instructor survey and the consensus of expert opinion were combined to develop a framework for perceptual modality instruction. Instructional activities were grouped according to their perceptual modality elements and listed in a hierarchy according to their common perceptual learning styles. Within each element grouping, the instructional activities were listed in order of effectiveness based on the instructor survey response. The

combined phases of the study represent an instructional resource for application of the perceptual modality learning style theory to the instructional activities of Marketing Education.

CHAPTER 4

PRESENTATION OF DATA AND RESULTS

The purpose of the study was to provide information useful for Marketing Education instructors in applying effective perceptual modality instructional techniques. This chapter presents the three research questions and the corresponding data resulting from the teacher survey, the Delphi classification, and the perceptual modality instructional framework which combines the survey and classification process.

RESEARCH QUESTIONS

Research Question One: What instructional activities are perceived to be most effective by Tennessee Marketing Education instructors as determined by a survey using activities drawn from the state curriculum guide?

To answer this question, the total number of teachers marking each activity as effective was compared to the total number of teachers responding for the activity. The instructors evaluated each instructional activity by selecting one of three choices: effective, not effective, and not applicable. The number of instructors that deemed each activity as effective was divided by the number of instructors responding to that activity on the survey. The resulting comparison is

shown as a percentage. In Table 3 the percentages of instructor agreement were grouped, and activities were counted for all those associated with that percentage grouping. The results show how instructors' ratings of activities were dispersed over the total survey. The largest number of activities, 10 (16%), was in the 85% to 89% group for instructor agreement on activity effectiveness. A large majority of activities (95%) were considered effective by the majority of instructors (50%). Only three activities (5%) were considered effective by less than 50% of the instructors.

Table 3

Number of Effective Instructional Activities by Grouped Percentage Based on Instructor Response

Percentage of Instructor Agreement	Number of Activities Agreed Upon
95-100%	6
90- 94%	6
85- 89%	10
80- 84%	6
75- 79%	4
70- 74%	4
65- 69%	5
60- 64%	7
55- 59%	5
50- 54%	6
45- 49%	1
40- 44%	0
35- 39%	1
30- 34%	1
	62

In Table 4 each of the 62 instructional activities was arranged in order of effectiveness rating from highest to lowest percentage. Of the 62 instructional activities evaluated, 59 (95%) were rated as effective by 50% or more of the instructors. A brief descriptive list of the instructional activities with percentage of instructor agreement for effectiveness of each activity, is shown following.

In Table 5, instructional activities rated as "not effective" were listed with the percentage of instructors in agreement concerning the relative effectiveness of each activity. Each of the 62 instructional activities was arranged in order from highest "not effective" percentage rating to lowest.

Table 6 lists those activities marked as "not applicable" by the instructors. Percentages of instructor agreement were tabulated and arranged from highest to lowest. The top five activities reflect use of equipment that may not be available in all programs.

The results of the instructor survey showed that the 28 activities selected by at least 80% of the instructors as effective were a variety of individual and group activities, participatory and observing activities, as well as equipment-linked and stand-alone activities. Of the three activities that were not rated as effective by at least 50% of the instructors, two received "not applicable" ratings by 39% and 57%. The activities were use of change maker machine and use of records and compact discs. Only one activity of the three received more "not effective" ratings (31%) than "not applicable" ratings (21%). That one activity, drawing and painting, retained an evaluation of "effective" from 48% of the instructors.

Table 4**Instructional Activities in Order of "Effective" Ratings**

Activity	Percentage of Instructors Who Evaluated Activity as Effective
1. Tests, Quizzes, Reviews	97.4%
2. Interview of the Student	97.4%
3. Demonstration by the Teacher	97.4%
4. Student Demonstration	97.4%
5. Role Play	94.9%
6. Teacher-Directed Group Discussion	94.9%
7. Guest Speaker	94.0%
8. Videotape	92.3%
9. Activities/Problem Solving (Orally)	91.5%
10. Information Handouts	91.3%
11. Worksheet Handouts	90.4%
12. Teacher Use of Overhead Projector-- Pictures	89.7%
13. Activities/Problem Solving (in Groups)	88.9%
14. Letter Writing	88.8%
15. Brainstorming	88.0%
16. Teacher Use of Overhead Projector-- Printed Information	87.9%
17. Oral Presentation	87.9%
18. Television Program	87.2%
19. Field Trip	87.2%
20. Communication with Business (in Person)	85.2%
21. Note Taking from Reading, Lecture	85.0%
22. Activities/Problem Solving (in Writing)	84.6%
23. Group Project	82.9%
24. Use of Pictures or Photos	82.9%
25. Cooperative Learning Groups	81.3%
26. Marketing Simulation Workbooks	80.9%
27. Lecture	79.8%

Table - continued

Activity	Percentage of Instructors Who Evaluated Activity as Effective
28. Written Report	79.5%
29. Display and/or Bulletin Board Construction	78.6%
30. Student Interview of Others	76.9%
31. Form Completion	76.1%
32. Use of Graphs, Tables	75.2%
33. Arrangement of Merchandise or Cash	74.4%
34. Textbook Chapter Exercises	72.2%
35. Library Research	70.9%
36. Survey Conduction	70.7%
37. Word Puzzles	69.2%
38. Films, Filmstrips	69.2%
39. Taking of Physical Inventory	68.4%
40. Computer Quizzes/Tests	66.4%
41. Student-Directed Panel Discussion	65.5%
42. Questionnaire Development	64.0%
43. Collage, Poster Development	62.1%
44. Student-Generated Listing	61.7%
45. Board and Card Games	61.5%
46. TV Spot Production	60.7%
47. Cut/Paste Examples	60.3%
48. Computer Instruction Simulation	59.5%
49. Computer-Assisted Tutorial	59.0%
50. Learning Activity Packages (LAPS)	58.6%
51. Use of the Telephone	58.1%
52. Debate	57.4%
53. Reading Assignment	57.0%
54. Radio Spot Production	53.8%
55. Plays, Skits	52.6%
56. Audiotape	52.6%
57. Slides with Audiotape	52.1%
58. Recitation by Others	51.7%
59. Brochure Development	49.6%
60. Drawing or Painting	47.8%
61. Use of Change Maker Machine	35.4%
62. Use of Records, Compact Discs	32.5%

Table 5**Instructional Activities in Order of "Not Effective" Ratings**

Activity	Percentage of Instructors Who Evaluated Activity as Not Effective
1. Reading Assignment	41.4%
2. Audiotape	38.8%
3. Recitations by Others	33.6%
4. Drawing or Painting	31.3%
5. Use of Records, Compact Discs	28.2%
6. Slides with Audiotape	28.2%
7. Textbook Chapter Exercises	25.2%
8. Student-Directed Panel Discussion	22.4%
9. Word Puzzles	21.4%
10. Films, Filmstrips	21.4%
11. Library Research	20.5%
12. Lecture	20.2%
13. Collage, Poster Development	19.8%
14. Student-Generated Listing	19.1%
15. Cut/Paste Examples	19.0%
16. Use of Graphs, Tables	18.8%
17. Questionnaire Development	17.5%
18. Debate	17.4%
19. Plays, Skits	17.2%
20. Learning Activity Packages (LAPS)	17.2%
21. Written Report	16.0%
22. Survey Conduction	15.5%
23. Board and Card Games	15.4%
24. Display and/or Bulletin Board Construction	15.4%
25. Student Interview of Others	14.5%
26. Note Taking	14.0%
27. Activities/Problem Solving (in Writing)	13.7%

Table - continued

Activity	Percentage of Instructors Who Evaluated Activity as Not Effective
28. Brochure Development	13.7%
29. Group Project	12.0%
30. Use of Telephone	12.0%
31. Oral Presentation	11.2%
32. Form Completion	11.1%
33. Taking of Physical Inventory	11.1%
34. Brainstorming	10.3%
35. Teacher Use of Overhead Projector-- Printed Information	9.5%
36. Cooperative Learning Groups	9.4%
37. Use of Pictures, Photos	9.4%
38. Activities/Problem Solving (in Groups)	9.4%
39. Information Handouts	8.7%
40. Worksheet Handouts	8.7%
41. Use of Change Maker Machine	8.1%
42. Activities/Problems Solving (Orally)	7.7%
43. Teacher Use of Overhead Projector-- Pictures, Artwork	6.9%
44. Radio Spot Production	6.8%
45. Communication with Business (in Person)	6.1%
46. Letter Writing	5.2%
47. Role Play	5.1%
48. Teacher-Directed Group Discussion	5.1%
49. Videotape	5.1%
50. TV Spot Production	5.1%
51. Arrangement of Merchandise or Cash	5.1%
52. Television Program	4.3%
53. Field Trip	4.3%
54. Student Demonstration	4.3%
55. Marketing Simulation Workbooks	3.5%
56. Guest Speaker	3.4%
57. Computer-Assisted Tutorial	3.4%
58. Computer Quizzes/Tests	3.4%
59. Tests, Quizzes, Reviews	2.6%
60. Computer Instruction Simulation	2.6%
61. Demonstration by the Teacher	1.7%
62. Interview of the Student	1.7%

Table 6**Instructional Activities in Order of "Not Applicable" Ratings**

Activity	Percentage of Instructors Who Evaluated Activity as Not Applicable
1. Use of Change Maker Machine	56.6%
2. Use of Records, Compact Discs	39.3%
3. Radio Spot Production	39.3%
4. Computer Instruction Simulation	37.9%
5. Computer-Assisted Tutorial	37.6%
6. Brochure Development	36.8%
7. TV Spot Production	34.2%
8. Plays, Skits	30.2%
9. Computer Quizzes/Tests	30.2%
10. Use of the Telephone	29.9%
11. Debate	29.9%
12. Learning Activity Packages (LAPS)	24.1%
13. Board and Card Games	23.1%
14. Drawing or Painting	20.9%
15. Cut/Paste Examples	20.7%
16. Taking of Physical Inventory	20.5%
17. Arrangement of Merchandise/Cash	20.5%
18. Slides with Audiotape	19.7%
19. Student-Generated Listing	19.1%
20. Questionnaire Development	18.4%
21. Collage, Poster Development	18.1%
22. Marketing Simulation Workbooks	15.7%
23. Recitations by Others	14.7%
24. Survey Conduction	13.8%
25. Form Completion	12.8%
26. Student-Directed Panel Discussion	12.1%

Table - continued

Activity	Percentage of Instructors Who Evaluated Activity as Not Applicable
27. Word Puzzles	9.4%
28. Films, Filmstrips	9.4%
29. Cooperative Learning Groups	9.4%
30. Communication with Business (in Person)	8.7%
31. Audiotape	8.6%
32. Television Program	8.5%
33. Library Research	8.5%
34. Student Interview of Others	8.5%
35. Field Trip	8.5%
36. Use of Pictures, Photos	7.7%
37. Use of Graphs, Tables	6.0%
38. Letter Writing	6.0%
39. Display and/or Bulletin Board Construction	6.0%
40. Group Project	5.1%
41. Written Report	4.3%
42. Teacher Use of Overhead Projector-- Pictures, Artwork	3.4%
43. Videotape	2.6%
44. Guest Speaker	2.6%
45. Teacher Use of Overhead Projector-- Printed Information	2.6%
46. Textbook Chapter Exercises	2.6%
47. Activities/Problem Solving (in Groups)	1.7%
48. Brainstorming	1.7%
49. Activities/Problem Solving (in Writing)	1.7%
50. Reading Assignment	.9%
51. Note Taking	.9%
52. Student Demonstration	.9%
53. Demonstration by Teacher	.9%
54. Oral Presentation	.9%
55. Interview of the Student	.9%
56. Worksheet Handouts	.9%
57. Activities/Problem Solving (Orally)	.9%
58. Role Play	0.0%
59. Teacher-Directed Group Discussion	0.0%
60. Lecture	0.0%
61. Information Handouts	0.0%
62. Test, Quizzes, Reviews	0.0%

Activities that were rated as "not effective" by instructors were reading assignment (41%) and audiotape (39%). At the bottom of the "not effective" ordered list were the activities, such as "interview of the student," which were at the top of the "effective" ordered list. The highest percentage of teachers evaluating activities as "not applicable" chose five activities which were equipment-related, such as change maker machine (57%), compact disc player (39%), radio spot production equipment (39%), or computers (38%). The activities may have been deemed "not applicable" for reasons other than being equipment-related.

Research Question Two: How would a national panel of experts in perceptual modality classify effective instructional activities according to perceptual modality elements using the Delphi Technique?

To answer this question, the Delphi Technique was used to establish consensus on the perceptual classification of each of 63 instructional activities. At the request of the Delphi panel, one of the original 62 activities was divided at the end of Delphi-I, resulting in a new total of 63 activities. The basis for the classification process was the seven elements identified in the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II). The elements were print, aural, interactive, visual, haptic, kinesthetic, and olfactory. The classification results were developed during three probes using the Delphi Technique and a ten-member panel of experts.

Delphi-I

The objective of the Delphi-I was to identify the primary dominant and secondary dominant element of perceptual modality for each of the 62 instructional activities. Using a "1" and "2" notation, Delphi panelists selected perceptual elements for each activity, with some panelists electing to choose up to four elements for some activities. Panelists were asked to write comments as necessary to explain their dominant element choice. The number of different elements initially chosen for each activity, referred to as width in the study, were reviewed for both dominant and secondary classification and are shown in Table 7. The group having a width of two elements for dominant classification was the largest of all groups. Of the 62 activities, 23 (37%) had two elements chosen as dominant elements. More activities were assigned two-element classifications on the first probe than either one, three, or four-element classifications.

Some panelists chose to list a second most dominant area; the number of different elements so rated was compiled. The greatest number (19 or 31%) of activities that were assigned more than one element classification by the panelists were those with three secondary elements. Unlike the dominant classifications, the second most dominant, or secondary classifications, reflected more representation in the groups having a larger number of elements. These groups, referred to as having greater width, included activities rated as having four and five elements by the Delphi panel. The greater number of activities with more than one element classification represent more diversity in panel judgment about

how that activity should be classified. In striving for consensus, the objective is that panelists agree on a narrow width, or one element classification. The width or number of elements selected as dominant and secondary dominant for each of the 62 instructional activities is summarized following.

In Delphi-I the participants reached the minimum level of agreement for consensus (70%) on 34 (55%) of the 62 activities, as shown in Table 8.

Consensus was obtained for the most dominant classification or "1" evaluation by the panelists. The number of activities within consensus was highest in the 90-99% range with 13 activities and 10 activities reaching 100% consensus. Five activities reached 80-89% consensus and six activities reached 70-79% consensus. and . The minimum level for secondary element consensus was set at agreement of four panel members. The largest numbers of activities (19) gaining consensus for secondary dominance were in the four-member and five-member groups of panel agreement. The number of activities resulting in consensus for dominant and secondary elements during Delphi-I is summarized following.

The 34 instructional activities on which there was consensus for dominant classification during the Delphi-I probe and the 23 secondary classifications are listed in Table 9. The activities are listed in order of perceived effectiveness and are given in their abbreviated form. A thorough activity description, additional classification results, and panel comments are given for the Delphi-I probe on the Delphi-II instrument in Appendix E. The percentage of agreement is given for dominant classifications, and secondary classifications are shown as proportions.

Table 7

Number and Percentage of Perceptual Elements Represented as Dominant and Secondary in All Instructional Activities for Delphi-I

Number of Elements Rated	<u>Dominant-Number of Activities</u>	<u>Dominant-Percentage of Total</u>	<u>Secondary-Number of Activities</u>	<u>Secondary-Percentage of Total</u>
1	10	16%	10	16%
2	23	37%	18	29%
3	16	26%	19	31%
4	13	21%	9	14%
5	0	-	5	8%
6	0	-	1	2%
7	0	-	0	-
	<u>62</u>	<u>100%</u>	<u>62</u>	<u>100%</u>

Table 8

Number of Instructional Activities Gaining Consensus in Dominant and Secondary Classifications During Delphi-I

Percentage of Consensus	Number "1"	Level of Consensus	Number "2"
70-79%	6	4	9
80-89%	5	5	9
90-99%	13	6	5
100%	10	-	-
	<u>34</u>		<u>23*</u>

* Total includes one double secondary classification.

Table 9:

Panelist Agreement for Dominant and Secondary Classification of Activities Reaching Consensus During the Delphi-I

Activity	Panelist Agreement						
Activity	Print	Aural	Interactive	Visual	Haptic	Kinetic	Olfactory
Tests, Quizzes, Reviews	80%						
Interview of the Student			70%				
Demonstration by the Teacher		6/8					
Guest Speaker		90%					
Videotape		6/6		91%			
Activities/Problem Solving (Orally)		70%	4/4				
Information Handouts	100%						
Worksheet Handouts	70%						
Teacher Use of Overhead Projector (Pictures)		5/6		90%			
Activities/Problem Solving (in Groups)		4/5	91%				
Letter Writing	90%						
Teacher Use of Overhead Projector (Print Information)	90%						
Oral Presentation				5/8			
Television Program		6/6		91%			
Communication with a Business (in Person)			90%				
Activities/Problem Solving (in Writing)	90%						
Group Project				6/8			
Use of Pictures, Photos				100%			
Cooperative Learning Groups		4/6	100%				
Lecture		100%					
Written Report	80%						
Display and/or Bulletin Board Construction				5/8			
Student Interview of Others			80%				
Form Completion	90%						
Use of Graphs, Tables	4/9						
Textbook Chapter Exercises	100%						
Library Research			5/9				
Survey Conduction			73%				
Word Puzzles	80%						
Films, Filmstrips		4/5		91%			
Computer Quizzes/Tests	70%						
Student-Directed Panel Discussion		4/5	90%				

Table- continued

Activity	Print	Aural	Interactive	Visual	Haptic	Kinetic	Olfactory
Questionnaire Development	90%						
Student-Generated Listing	80%						
TV Spot Production						4/11	
Cut/Paste Examples					5/7		
Computer Instruction Simulation	5/11			5/11			
Computer-Assisted Tutorial	5/9						
Learning Activity Packages (LAPS)	100%						
Reading Assignment	100%						
Radio Spot Production	4/8						
Plays, Skits	4/10						
Audiotape		100%					
Slides with Audiotape		6/9		73%			
Recitation by Others		100%					
Brochure Development				5/8			
Use of Records, Compact Discs		100%					
Gaining Dominant Consensus	15	6	7	6	0	0	0
Gaining Secondary Consensus	5	9	2	5	1	1	0
Total Activities *	20	15	9	11	1	1	0

* Note: Totals reflect one double secondary classification for one activity.

Note: Percentages reflect dominant classification agreement, proportions denote secondary classification agreement.

More print activities (15) reached consensus for dominant classification on the first probe, and more aural activities (9) reached consensus for secondary classification than other perceptual elements.

Delphi-II

The objective of the Delphi-II probe was to classify 63 instructional activities according to elements of perceptual modality present in them after evaluating the choices and comments of other panel members. The Delphi-II instrument included percentage totals of panelists choosing each element for each instructional activity. The secondary element was shown as a proportion (6/8) because all panel members did not elect to list "2" classifications. All comments from the Delphi-I instrument were listed on the Delphi-II. The Delphi-II probe was initiated following the second pilot study. All ten members of the panel responded by marking their instrument with "1" for the most dominant classification and with "2" for the second most dominant classification. Members were encouraged to write comments, especially if their new element choice did not fall in the majority classification.

The width, or number, of element classifications from the Delphi-I to the Delphi-II results showed a narrowing toward the "1" and "2" element classifications. Table 10 compares the element width, or number of element classifications, of Delphi-I and Delphi-II. When comparing the results of the two probes, the single-element classification gained the most in number of activities

Table 10**Comparison of Width of Dominant Element Classification from the Delphi-I to the Delphi-II**

Number of Elements	Number of Activities- % of Total Delphi-I	Number of Activities- % of Total Delphi-II	Number of Activities Changed
1	10 - 16%	31 - 49.2%	+ 21
2	23 - 37%	28 - 44.4%	+ 5
3	16 - 26%	2 - 3.2%	- 14
4	13 - 21%	2 - 3.2%	- 11
	$\overline{100\%}$	$\overline{100\%}$	+ $\overline{1}$ net change

Note: Delphi-I is based on 62 instructional activities; Delphi-II is based on 63 total instructional activities because one activity was divided into two parts for the Delphi-II.

while the number of activities assigned three dominant classifications was reduced the most between probes. The movement from three or four-element classifications to one or two-element classifications is an indication of movement toward consensus by the panel.

The evolvement of panel consensus from the Delphi-I to the Delphi-II is summarized in Table 11. Consensus for the first or dominant element was set at 70%. Of the 63 instructional activities, 34 gained classification consensus on the Delphi-I, totaling 55% of the 62 activities. During the Delphi-II an additional 24 out of 29 remaining activities, or 38% of the 63 total activities, gained classification consensus. The resulting total was 58 activities (92%) classified for dominant perceptual element.

Table 11

Summary of Dominant and Secondary Elements Gaining Consensus for Delphi-I and Delphi-II

Level of Element	Delphi-I Activities- Percentages	Delphi-II Activities- Percentages	Total of Delphi-I & II
Dominant, "1"	34 - 54%	24 - 38%	58 - 92%
Second, "2"	24 - 60%	10 - 25%	34 - 85%

Note: Secondary percentages are based on 40 activities designated by the panel for two levels of classification.

Consensus for the second dominant element was set at a minimum of four panel members selecting the same element. During the Delphi-I, 23 of the 62 activities (37%) reached the required consensus number. On the second probe, panelists reached consensus on an additional 10 for a total of 34 activities. The panelists did not classify all 63 activities as having two perceptual modality elements. Only 40 of the 63 activities were perceived by the panel as having a second classification. The 24 activities gaining classification consensus during the Delphi-I represent 60% of the total 40 secondary classifications. The 34 activities gaining consensus during the Delphi-II represent 85% of the 40 activities that panelists selected as having two elements.

The number and percentage of activities gaining consensus by dominant element for Delphi-II are shown in Table 12. The dominant classifications showed that out of 63 total activities, there were 19 print activities (31%), 15

Table 12**Number and Percentage of Activities Gaining Consensus by Dominant Element Classification for Delphi-II**

Element	Number of Activities Where Dominant	Percentage of Activities Where Dominant
Print	19	31%
Aural	9	15%
Interactive	15	25%
Visual	14	23%
Haptic	2	3%
Kinesthetic	2	3%
Olfactory	0	-
	<u>61*</u>	<u>100%</u>

* Includes three double dominant activities.

interactive activities (25%), and 14 visual activities (23%). The number of activities and percentages by element are shown above.

After dominant classifications were selected by the panel, optional secondary classifications were secured for the multi-modal activities. The perceptual modality elements profiled, in Table 13, from the consensus of the secondary or "2" classifications include aural activities as the predominant element. Of the 40 activities selected by the panel for secondary classification, 14 activities (35%) were denoted as aural. Visual and haptic activities were equal in number with 6 in each group, representing 15% of the total attempted secondary classifications. The interactive classification made up 12.5% of the total activities selected for secondary rating, and print activities comprised 10% of the 40

Table 13**Numbers and Percentages of Secondary Activities Gaining Consensus by Element Based on Secondary and Total Activities for Delphi-II**

Element	Number of Secondary Activities	Percentage of Secondary Activities	Percentage of Total Activities
Print	4	11.5%	10.0%
Aural	14	40.0%	35.0%
Interactive	5	14.3%	12.5%
Visual	6	17.1%	15.0%
Haptic	6	17.1%	15.0%
Kinesthetic	0	-	-
Olfactory	0	-	-
	<u>35*</u>	<u>100%</u>	<u>87.5%**</u>

* Represents 34 activities with one double secondary classification.

** Percentage of activities out of 40 activities selected for secondary classification.

activities. The number of activities and percentages of "secondary activities" and "total activities" are shown in the following table.

Delphi-II results showed that several issues concerning classification had developed. The issues were evidenced by a combination of mixed response in the classification process and comments from the panelists conveying some amount of theoretical disagreement. These emerging issues warranted more discussion. Each panel member was interviewed regarding these issues. Panelists' comments were individually summarized and returned to them for inspection. After receiving panelists' confirmations, their comments were combined under issue headings and sent to all Delphi panel members. This procedure served to provide additional information on the Delphi-II comments so that all members could

review the input of other panel members to aid in the classification process. The specific comments are included in Appendix F. Comments of the panelists are their interpretations of the MMPALT II elements and their relationships to learning theory. Comments summarized below are panelists' opinions and may not be based on specific research.

Haptic Versus Print: When considering a writing activity, the original definition of print includes writing, so the act of note taking would be classified as print. The secondary classification may be haptic from using the pencil. The major consideration is what constitutes new learning and what is a reinforcement activity for the student? A learner in the habit of taking notes or keyboarding may not access new information through an "automatic," required physical mode. For learners using a keyboard for the first time, classification would be as a haptic activity. When fingers are used for muscle memory, the activity is haptic.

Visual Versus Print: Some panelists saw a link between visual and print elements by visualizing in their minds the total picture before generating print in notes or on computer. Another panelist saw producing symbols as print and interpretation of symbols as a visual activity. Based on one panelist's comment, a low correlation exists between print and visual elements, but some overlap does exist. Visual learners can recall where the information is located on the printed page.

Multi-Modal Activities: It is difficult to classify only one dominant element or even dominant and secondary elements in some activities. Several modes may provide equal access to information by the learners. Learners will access

information through their own styles even when using a secondary style. In a like manner, learners can benefit from information presented in a perceptual mode other than their high or dominant mode. A question for consideration is, "Does the learning become enhanced if the perceptual mode of presentation and the learner's dominant learning mode are paired?" One panelist observed that a visual learner can feel an object and take a mental snapshot of it for retention. Several panelists agreed that there may be several secondary and even third level elements. A common linkage in several activities is interactive and aural because some panelists expressed the belief that listening and talking represent a common communication pattern.

Group Projects Versus Individual Activities: Group activities and individual activities may offer equal opportunities for the learner to access information, depending on the structure of the instructional activity. Learners with different perceptual styles may equally acquire information from a multi-modal activity regardless of whether the perceptual elements represented in the activity are assigned a dominant or secondary classification. The activity will be equally effective for learners with a variety of perceptual learning styles. A teacher-directed activity (as are many individual activities) often dictates a specific perceptual mode for instruction. Group activities allow students more flexibility to choose their mode of participation. Group projects often involve more movement, but several panelists feel that walking should not be considered kinesthetic for activity classification purposes. They believe that movement of objects or using

movement to teach a concept is important in assigning the kinesthetic classification to a group activity.

What Happens First: In multi-modal activities what happens first, or the first step in the activity, does not necessarily exemplify the dominant element. The usual step of reading directions first does not mean the learner cannot watch another learner to determine how to do the activity without reading directions and receive the dominant benefit from doing the central part of the activity. Other activities require the first element to be a dominant learning mode before the second element can be used. For example, in note taking from teacher lecture, hearing the lecture (dominant) must come before taking the notes (secondary).

Results of the element classifications for instructional activities completed during this probe were combined with the final probe ratings in summary format. (Results are shown in Table 17 in the Delphi-III section.)

Delphi-III

The objective of the Delphi-III was to classify five activities where no consensus regarding style orientations had been achieved in the earlier probes. A second objective was for panelists to indicate the level of acceptance of the final classifications. The process was facilitated by providing each panel member with additional information summarized from each member's interview comments. The interview comments served as a supplement to Delphi-II comments, and both

sources were included in the Delphi-III iteration. Activities already assigned classifications were grouped according to perceptual modality orientations.

Evaluating the consensus convergence includes a study of the desired narrowing process as shown in Figure 1. Initially, the widest possible choice for classification was seven elements, and when multiplied by 62 activities, the total width of choice was 434. At the conclusion of the Delphi-I, 156 elements were chosen as most dominant when totaling all 62 activities. Following the Delphi-I, elements chosen as most dominant diminished to 101 based on total elements selected for this probe. The resulting number of dominant elements from the Delphi-III was 95. The narrowing of classifications typical under the Delphi

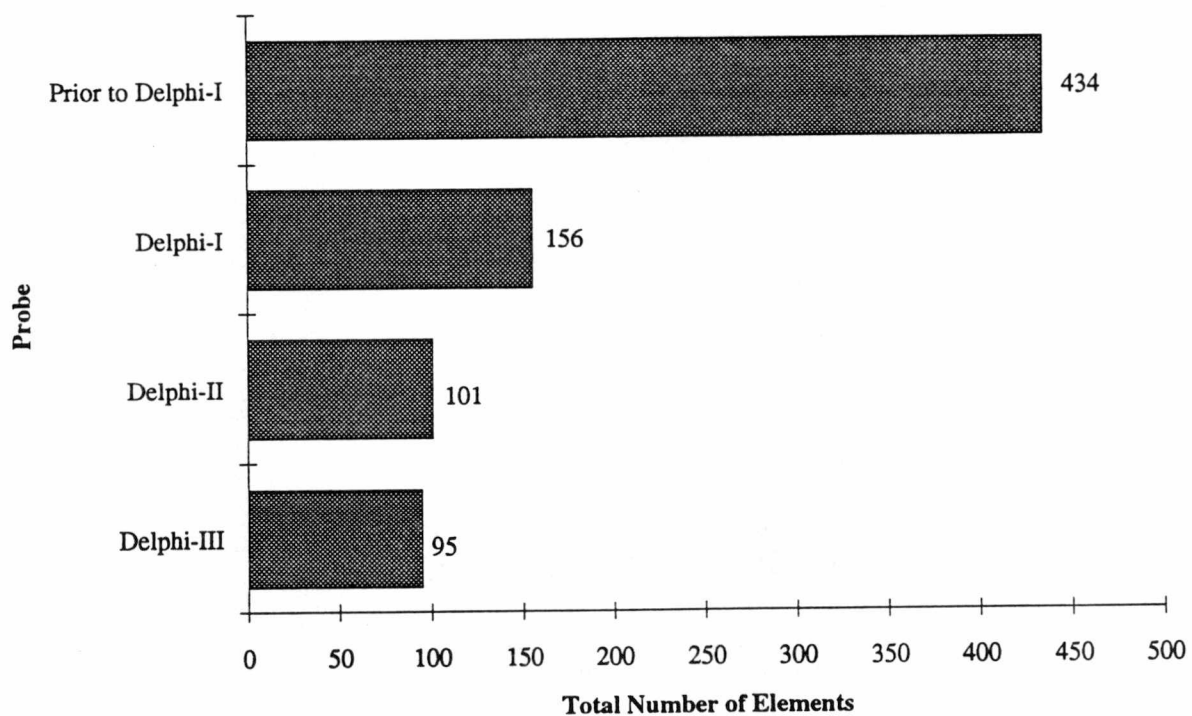


Figure 1: Summary of Convergence for Dominant Elements Chosen by Panelists for Each Delphi Probe

Technique is summarized following.

The narrowing of the number of elements in the classification process may also be noted in Figure 2. The width or number of elements and number of activities in each range grouping are listed with percentages for each Delphi probe. On the first probe 16 activities were classified using three perceptual elements, and 13 were classified with four elements. After the last probe one activity was classified with three elements, and no activities were classified with four element classifications. During the Delphi process the movement was from a variety of classifications to only one or two elements, typical in the narrowing process.

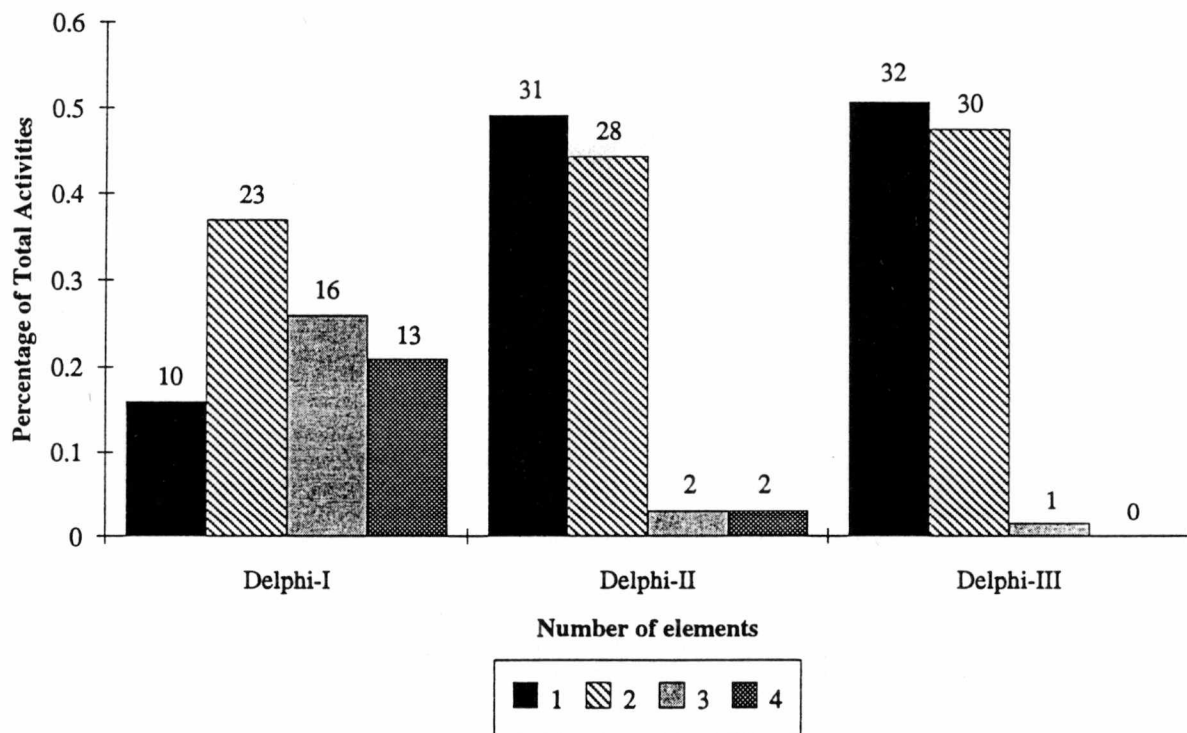


Figure 2: Comparison of Width of Dominant Element Classification from the Delphi-I Through Delphi-III

A summary of dominant classifications for all activities in the Delphi-III is shown in Figure 3. The largest element group included 19 activities (28.8%) rated by all panelists as dominantly print. Sixteen activities, comprising 24.3% of the total 63 activities, were rated as interactive. The third most identified element was visual, which was classified as dominant in 15 activities (22.7%). The aural element was thought to be dominant in 10 of the 63 activities listed (15.2%). Only three (4.5%) of the activities were classified for dominant element as haptic or kinesthetic. Only three (4.5%) of the activities were classified for dominant element as haptic or kinesthetic.

Figure 4 shows the proportional element classifications for secondary consideration. When identifying secondary elements in activities, Delphi panelists assigned aural classifications to 14 (35%) of the 40 activities selected by the panelists for secondary element evaluation. Visual, haptic, print, and interactive

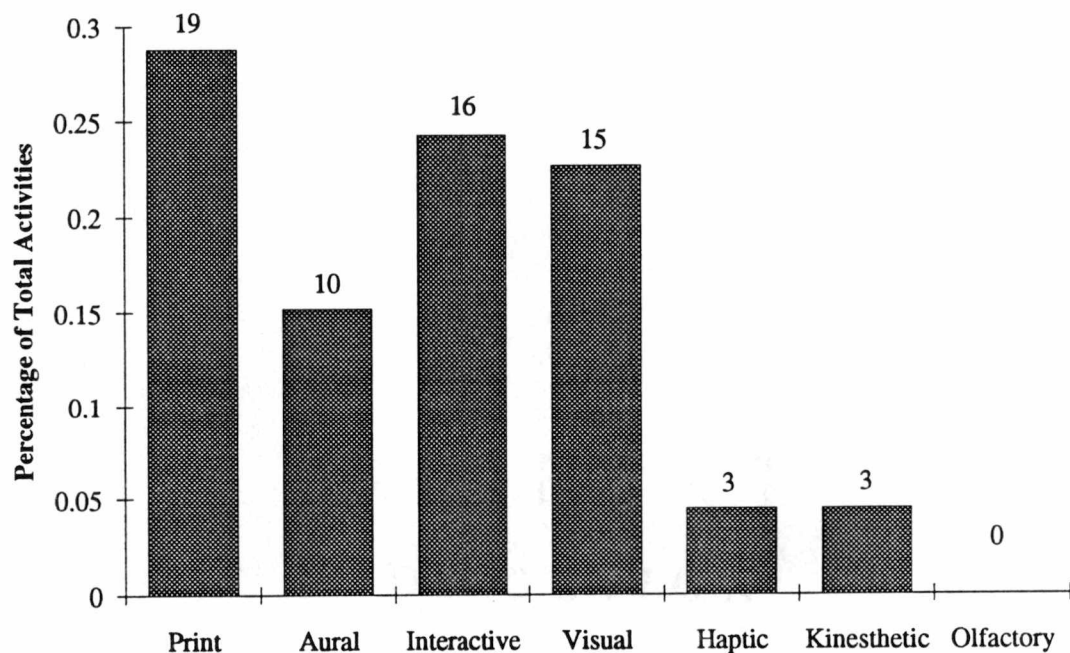


Figure 3: Summary of Dominant Classifications by Perceptual Modality Element for Delphi-III

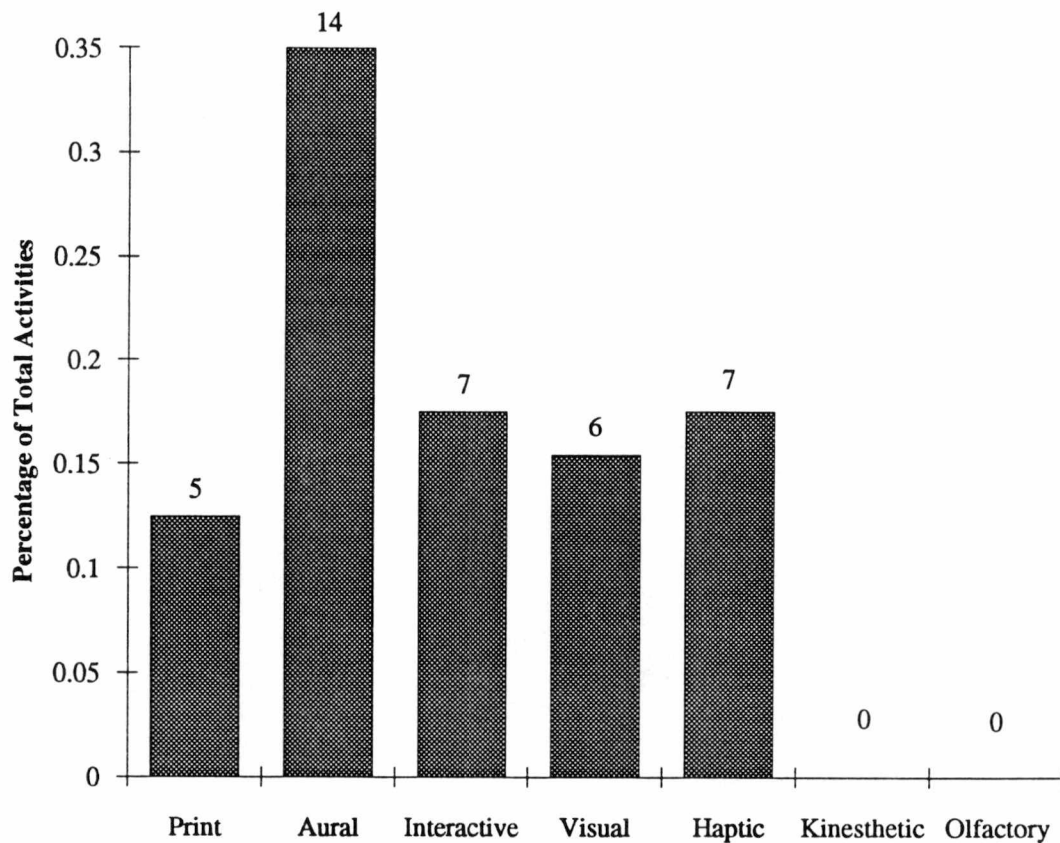


Figure 4: Summary of Secondary Classifications by Perceptual Modality Element for Delphi-III

elements were similar in percentages represented. Kinesthetic and olfactory were not classified as secondary elements.

During the Delphi process, 100% of the panel members responded to all three probes. Their classifications of dominant or "1" elements are summarized for each activity, for each element, and for each Delphi probe in terms of percentages. In a like manner, secondary or "2" elements are summarized but in proportional format based on the total number of panel members choosing to use the "2" classification. The summarized data for each probe is included in Appendices D, E, F, and G.

The consensus level for dominant element classification was set at 70%. All 63 instructional activities gained consensus for dominant classification. Table 14 is a summary of the levels of panel agreement within the 70% consensus level. Panelists most often agreed on print, interactive, and visual activities. The 12 activities gaining 100% agreement for element classification were print activities which represent the largest element group.

The Delphi-III was used primarily to group activities by style orientation and to enable panelists to indicate their level of acceptance of each activity classification. On the instrument each activity was labeled with first ("1") and second ("2") dominant element classification, and panelists marked their level of acceptance separately for the "1" and "2" classifications indicated. Panelists could choose from "high acceptance," "moderate acceptance," "low acceptance," or "no acceptance." The tabulation (Table 15) shows high acceptance for the activities' perceptual modality classification in both dominant and secondary elements. Panel members had high acceptance of the dominant classifications, with 93% of all acceptance choices marked as "high acceptance." Panel members gave high acceptance to the secondary elements with 74% of all secondary acceptance choices indicated for "high acceptance." Collectively, the panel endorsed the final classification decisions. One panel member chose "no acceptance" for two of the dominant classifications, and two panelists chose not to accept three of the secondary element classifications. Based on comment response of the panelists listing rejections, the lack of acceptance was that the dominant and secondary

Table 14**Summary of Number of Activities Gaining Consensus for Dominant Classification**

Element	Number of Activities So Rated by All Panelists	Number of Activities So Rated by 70% - 99% of Panelists
Print	12	7
Aural	5	5
Interactive	8	8
Visual	5	10
Haptic	0	3
Kinesthetic	0	3
Olfactory	0	0
	<u>30</u>	<u>36</u>

Note: The total of both consensus columns is 66, which includes three double dominant activities.

Table 15**Summary of Acceptance Level of Dominant and Secondary Classification by Delphi Panel for All Instructional Activities**

Element	Frequency and % of High Acceptance	Frequency and % of Moderate Acceptance	Frequency and % of Low Acceptance	Frequency and % of No Acceptance
Dominant	540 - 93%	25 - 4%	9 - 2%	4 - 1%
Secondary	234 - 74%	55 - 17%	27 - 8%	2 - 0%
	<u>774 - 86%</u>	<u>80 - 9%</u>	<u>36 - 4%</u>	<u>6 - 1%</u>

Note: Total panelists' choices are based on 578 responses for dominant and 318 for secondary classifications.

classification should 1) be switched or 2) be double dominant, or 3) that writing should not be listed as a haptic activity. The writing question was included in the issues interview following the Delphi-II. The detailed response profile is shown on the Delphi-III Result Summary in Appendix G.

Based on the comments following the Delphi-II, panel members believe that multi-modal activities can often address student perceptual styles equally, regardless of the dominant or secondary classification. In order to look at the number of activities that would address either the dominant or secondary perceptual style of the learner, Table 16 shows the combined number of dominant and secondary classifications by element. The result of the "2" level classification of instructional activities indicates that the largest combination of elements (dominant and secondary) comes within the interactive-aural classification. A total of eight activities fall in this classification and represent 20% of all "2" level activities. There are no activities with olfactory classification combined with another perceptual element. Only two element combinations exist for dominant kinesthetic activities and three for dominant haptic activities. Within the single level classifications, print activities are most prevalent with 13 activities (43%) of the 30 single dominant activities classified. The lowest number of activities with single style elements were haptic, kinesthetic, and olfactory activities. A summary chart of the dominant and secondary classifications is shown following.

Completion of the third Delphi probe resulted in all 63 activities being classified according to perceptual modality element. Table 17 shows the activities

Table 16**Number of Activities for Combined Dominant and Secondary Classifications**

Secondary Element	Dominant Element						
	Print	Aural	Interactive	Visual	Haptic	Kinesthetic	Olfactory
Print	13	1	1	3	0	0	0
Aural	0	8	8	5	0	0	0
Interactive	2	1	4	1	0	1	0
Visual	1	0	2	4	3	1	0
Haptic	3	0	2	2	0	0	0
Kinesthetic	0	0	0	0	0	1	0
Olfactory	0	0	0	0	0	0	0
	$\overline{19}$	$\overline{10}$	$\overline{17}$	$\overline{15}$	$\overline{3}$	$\overline{3}$	$\overline{0}$

Note: The total of 67 elements represents three double dominant and one double secondary classifications.

in abbreviated format and ordered by perceived effectiveness. The classifications for dominant (1) and secondary (2) elements are indicated for each activity.

Based on the Delphi-III responses to the issues raised at the close of the Delphi-II, panelists' views can be evaluated to some extent. Issues and resulting observations based on the panel's classifications and levels of acceptance of those classifications can now be summarized.

Haptic Versus Print: Instructional activities that were recognized as pencil-and-paper exercises were classified as haptic but usually as a secondary element. Examples are taking tests and completing worksheets. Activities for writing that did not show haptic as a secondary element usually showed haptic as the third

Table 17

Effective Instructional Activities Classified by Perceptual Modality Element

Activity	Perceptual Element						
Activity	Print	Aural	Interactive	Visual	Haptic	Kinetic	Olfactory
Tests, Quizzes, Reviews	1				2		
Interview of the Student		2	1				
Demonstration by the Teacher		2		1			
Student Demonstration						1	
Role Play			1				
Teacher-Directed Group Discussion		1 2	1				
Guest Speaker		1					
Videotape		2		1			
Activities/Problem Solving (Orally)		1	2				
Information Handouts	1						
Worksheet Handouts	1				2		
Teacher Use of Overhead Projector (Pictures)				1			
Activities/Problem Solving (in Groups)		2	1				
Letter Writing	1						
Brainstorming		2	1				
Teacher Use of Overhead Projector (Print Information)	1						
Oral Presentation			1	2			
Television Program		2		1			
Field Trip		1		1			
Communication with a Business (in Person)		2	1				
Note Taking from Reading	1	1					
Lecture	2						
Activities/Problem Solving (in Writing)	1						
Group Project			1		2		
Use of Pictures, Photos				1			
Cooperative Learning Groups			1				
Marketing Simulation Workbooks	1		2				
Lecture		1					
Written Report	1						
Display and/or Bulletin Board Construction			1	2	2		
Student Interview of Others		2	1				
Form Completion	1						

Table - continued

Activity	Perceptual Element						
Activity	Print	Aural	Interactive	Visual	Haptic	Kinetic	Olfactory
Use of Graphs, Tables	2			1			
Arrangement of Merchandise or Cash				2	1		
Textbook Chapter Exercises	1						
Library Research	1		2				
Survey Conduction		2	1				
Word Puzzles	1						
Films, Filmstrips		2		1			
Taking of Physical Inventory				2		1	
Computer Quizzes/Tests	1						
Student-Directed Panel Discussion		2	1				
Questionnaire Development	1						
Collage, Poster Development				1	2		
Student-Generated Listing	1				2		
Board and Card Games			2	1			
TV Spot Production			1				
Cut/Paste Examples				1	2		
Computer Instructional Simulation	2			1			
Computer-Assisted Tutorial	2			1			
Learning Activity Packages (LAPS)	1						
Use of the Telephone		1	1 2				
Debate		2	1				
Reading Assignment	1						
Radio Spot Production	2		1				
Plays and Skits			2			1	
Audiotape		1					
Slides with Audiotape		2		1			
Recitation by Others		1					
Brochure Development	1			2			
Drawing or Painting				2	1		
Change Maker Machine				2	1		
Use of Records, Compact Discs		1					

Note: Dominant element classifications are indicated with "1"; secondary with "2".

element, which was not addressed by the study. Haptic was the dominant element in drawing and painting but was secondary in other art-related activities, such as collage, poster development, and cut/paste activities. Print classifications appeared to be consistent with the original definition, which included reading and writing activities. Writing being classified as print also applied to activities involving the use of a computer. Computer activities requiring keyboard input were classified as print or visual for dominant or secondary classification.

Visual Versus Print: Only two activities were classified where visual and print were grouped as the dominant and secondary classification in the same activity. Only one member of the panel saw a consistent link in visual and print activities. The issue had diminished by the close of the third probe.

Multi-Modal Activities: Many panelists stated that the more complex activities should be classified according to three or four levels to allow for a wider spectrum of elements to be identified. Some activities achieved consensus for the dominant element, but panelists were diverse in the secondary element choices. One example was television spot production, which had an equal secondary classification as print and kinesthetic with neither element gaining consensus for secondary dominance. The most difficult multi-modal activities to classify were the five activities that were not classified during Delphi-II and were reevaluated on the Delphi-III in order to reach a consensus. These five activities showed a wide range of element classifications or had strongly divided responses on the first probe, Delphi-I.

Group Versus Individual Activities: The majority (86%) of activities listed as group activities in the Delphi instrument description were classified as interactive for the dominant element. In a group activity that involved movement, the kinesthetic element was not used when classifying the activity. Comments from some panelists indicate that the action of walking during a group activity is more a method of transportation than of learning. They wrote that body movement, not simply walking, is the key for kinesthetic classification.

What Happens First: The first perceptual style element the learner uses in a multi-modal activity was not always classified as dominant merely because it was used first. For example, taking physical inventory might begin with a reading assignment of how to proceed, but the dominant element classification for that activity is kinesthetic, not print. Note taking from lecture is an example of an exception. The activity was classified as dominantly aural because a learner must first hear before he/she can write.

Research Question Three: Can a framework be developed to combine effective teacher-directed instructional activities as identified by instructors and perceptual modality classification as determined by the consensus of expert opinion?

To answer the question, instructional activities were ordered by the percentage of "effective" responses each received during Phase I of the study. The ordered activities, shown in Table 18, were arranged by perceptual element classification, drawing on the results of Phase II of the study. The perceptual

Table 18

Framework for Dominant Visual, Interactive, and Haptic Activities Ordered by Effectiveness--Level I (Most Predominant Learner Styles)

Visual
1. Demonstration by the Teacher 2. Videotape 3. Teacher Use of Overhead Projector--Pictures, Artwork 4. Field Trip 5. Television Program 6. Use of Pictures, Photos 7. Use of Graphs, Tables 8. Films, Filmstrips 9. Collage, Poster Development 10. Board and Card Games 11. Cut/Paste Examples 12. Computer Instruction Simulation 13. Computer-Assisted Tutorial 14. Slides with Audiotape
Interactive
1. Interview of the Student 2. Role Play 3. Teacher-Directed Group Discussion 4. Activities/Problem Solving (In Groups) 5. Brainstorming 6. Oral Presentation 7. Communication with a Business (in Person) 8. Group Project 9. Cooperative Learning Groups 10. Display and/or Bulletin Board Construction 11. Student Interview of Others 12. Survey Conduction 13. Student-Directed Panel Discussion 14. TV Spot Production 15. Use of the Telephone 16. Debate 17. Radio Spot Production
Haptic
1. Arrangement of Merchandise or Cash 2. Drawing or Painting 3. Use of Change Maker Machine

Note: Activities include three double dominant element classifications.

element classifications were also ordered using the research findings of James and Blank (1991b), which demonstrated that visual, interactive, and haptic are the most predominant perceptual styles among learners. These three element groups form Level I of the framework. Level II of the framework includes the aural, print, kinesthetic, and olfactory element groups. No activities were identified as olfactory in the study. The instructional activities are arranged in order of perceived effectiveness within the perceptual style orientation assigned to them as dominant. The result was a continuum within a continuum. All activities are listed in an abbreviated form. Thorough activity descriptions are given on each Delphi probe in Appendices D, E, F, and G. Table 19 displays the hierarchy of "effective" activities within the secondary level of predominant perceptual styles among learners.

Based on comments from the panel of experts that different learners having dominance in two different modes may access instructional information equally well in either mode, the framework format was modified. The framework, Table 20, includes both dominant and secondary elements in order of effectiveness. The secondary elements are indented in the hierarchy list based on perceived level of effectiveness. The elements are arranged in order of predominant learner modalities to form Level I and Level II of the framework. Level I is based on research by James and Blank (1991b) and includes the most prevalent perceptual modes of learners: visual, interactive, and haptic. Level II includes the second most prevalent learning modes: aural, print, kinesthetic, and olfactory. Table 21

Table 19

Framework for Dominant Aural, Print, Kinesthetic Activities Ordered by Effectiveness--Level II (Less Predominant Learner Styles)

Aural
1. Teacher-Directed Group Discussion 2. Guest Speaker 3. Activities/Problem Solving (Orally) 4. Field Trip 5. Note Taking (from Teacher Lecture) 6. Lecture 7. Use of the Telephone 8. Audiotape 9. Recitation by Others 10. Use of Records, Compact Discs
Print
1. Tests, Quizzes, Reviews 2. Information Handouts 3. Worksheet Handouts 4. Letter Writing 5. Teacher Use of Overhead Projector--Printed Information 6. Note Taking (from Reading) 7. Activities/Problem Solving (in Writing) 8. Marketing Simulation Workbooks 9. Written Report 10. Form Completion 11. Textbook Chapter Exercises 12. Library Research 13. Word Puzzles 14. Computer Quizzes/Tests 15. Questionnaire Development 16. Student-Generated Listing 17. Learning Activity Packages (LAPS) 18. Reading Assignment 19. Brochure Development
Kinesthetic
1. Student Demonstration 2. Taking of Physical Inventory 3. Plays, Skits

Note: Activities include three double dominant element classifications.

Table 20

Framework for Dominant and Secondary Visual, Interactive, and Haptic Instructional Activities--Level I (Most Predominant Learner Styles)

Visual
. Demonstration by the Teacher . Videotape . Teacher Use of Overhead Projector--Pictures, Artwork . Oral Presentation . Field Trip . Television Program . Use of Pictures, Photos . Display and/or Bulletin Board Construction . Use of Graphs, Tables . Arrangement of Merchandise or Cash . Films, Filmstrips . Taking of Physical Inventory . Collage, Poster Development . Board and Card Games . Cut/Paste Examples . Computer Instruction Simulation . Computer-Assisted Tutorial . Slides with Audiotape . Brochure Development . Drawing or Painting . Use of Change Maker Machine

Table - continued

Interactive
. Interview of the Student . Role Play . Teacher-Directed Group Discussion . Activities/Problem Solving (Orally) . Activities/Problem Solving (in Groups) . Brainstorming . Oral Presentation . Communication with a Business (in Person) . Group Project . Cooperative Learning Groups . Marketing Simulation Workbooks . Library Research . Display and/or Bulletin Board Construction . Student Interview of Others . Survey Conduction . Student-Directed Panel Discussion . TV Spot Production . Use of the Telephone . Debate . Radio Spot Production . Plays, Skits . Board and Card Games
Haptic
. Tests, Quizzes . Worksheet Handouts . Group Project . Display and/or Bulletin Board Construction . Arrangement of Merchandise or Cash . Collage, Poster Development . Student-Generated Listing . Cut/Paste Examples . Drawing or Painting . Use of Change Maker Machine

Note: Indented activity designates secondary modality classifications.

Table 21

Framework for Dominant and Secondary Aural, Print, and Kinesthetic Instructional Activities--Level II (Less Predominant Learner Style)

Aural
. Teacher-Directed Group Discussion . Interview of the Student . Demonstration by the Teacher . Guest Speaker . Videotape . Activities/Problem Solving (Orally) . Activities/Problem Solving (in Groups) . Brainstorming . Field Trip . Television Program . Communication with a Business (in Person) . Note Taking (from Teacher Lecture) . Lecture . Student Interview of Others . Survey Conduction . Student-Directed Panel . Use of the Telephone . Debate . Audiotape . Slides with Audiotape . Recitation of Others . Use of Records, Compact Discs

Table - continued

Print
. Tests, Quizzes, Reviews . Information Handouts . Worksheet Handouts . Letter Writing . Teacher Use of Overhead Projector--Printed Information . Note Taking (from Reading) . Note Taking (from Teacher Lecture) . Activities/Problem Solving (in Writing) . Marketing Simulation Workbooks . Written Reports . Form Completion . Use of Graphs, Tables . Textbook Chapter Exercises . Library Research . Word Puzzles . Computer Quizzes/Tests . Questionnaire Development . Student-Generated Listing . Computer Instruction Simulation . Computer-Assisted Tutorial . Learning Activity Packages (LAPS) . Reading Assignment . Radio Spot Production . Brochure Development
Kinesthetic
. Student Demonstration . Taking of Physical Inventory . Plays, Skits

Note: Indented activities designate secondary modality classifications.

shows the hierarchy of activities within the second level of predominant perceptual styles among learners. The activities classified with secondary elements are indented in the framework.

The final framework was condensed from Table 20 and Table 21 into one page for an instructional resource. Figure 5 shows the Framework for Perceptual Modality Instruction with instructional activities in abbreviated form. The framework format combines dominant and secondary classifications in order of perceived effectiveness and in order of predominant learners' perceptual modes (James & Blank, 1991b).

It should be noted that the theories of Milone (1981) and Jenkins (1988) suggest that some learners may actually choose how to extract information from an activity where more than one modality element is present. If this is true, the phenomenon represents personal choice on the part of the learner. A third level of the instructional framework is suggested as a "point of intervention" at which learners may take additional instruction by a method of their choice. This "Level III" has not been addressed in Figure 5 which displays only the elements or combinations of elements present in the activities investigated.

Summary

Data obtained in this two-phase study were analyzed and presented in this chapter. Frequencies and percentages were used in table format to give summaries of data for each segment of the study. Three research questions were

Framework for Perceptual Modality Instruction

Level I-Predominant Learner Styles

Visual

- Demonstration by the Teacher
- Videotape
- Teacher Use of Overhead Projector—Pictures, Artwork
- Oral Presentation
- Field Trip
- Television
- Use of Pictures, Photos
- Use of Graphs, Tables
- Display and/or Bulletin Board Construction
- Arrangement of Merchandise or Cash
- Films, Filmstrips
- Taking of Physical Inventory
- Collage, Poster Development
- Board and Card Games
- Cut/Paste Examples
- Computer Instruction Simulation
- Computer-Assisted Tutorial
- Slides with Audio tape
- Brochure Development
- Drawing or Painting
- Change Maker Machine

Interactive

- Interview of the Student
- Role Play
- Teacher-Directed Group Discussion
- Activities/Problem Solving (Orally)
- Activities/Problem Solving (in Groups)
- Brainstorming
- Oral Presentation
- Communication with a Business (in Person)
- Group Project
- Cooperative Learning Groups
- Marketing Simulation Workbooks
- Library Research
- Display and/or Bulletin Board Construction
- Student Interview of Others
- Survey Conducted
- Student-Directed Panel Discussion
- TV Spot Production
- Use of the Telephone
- Debate
- Radio Spot Production
- Plays, Skits
- Board and Card Games

Haptic

- Tests, Quizzes, Reviews
- Worksheet Handouts
- Group Project
- Display and/or Bulletin Board Construction
- Collage, Poster Development
- Student-Generated Listing
- Cut/Paste Examples
- Drawing or Painting
- Change Maker Machine

Level II-Less Predominant Learner Styles

Aural

- Teacher-Directed Group Discussion
- Interview of the Student
- Demonstration by the Teacher
- Guest Speaker
- Videotape
- Activities/Problem Solving (Orally)
- Activities/Problem Solving (in Groups)
- Brainstorming
- Field Trip
- Television Program
- Communication with a Business (in Person)
- Note Taking (from Teacher Lecture)
- Lecture
- Student Interview of Others
- Survey Conducted
- Student-Directed Panel Discussion
- Use of the Telephone
- Debate
- Audiocass
- Slides with Audiocass
- Recitation by Others
- Use of Records, Compact Discs

Print

- Tests, Quizzes, Reviews
- Information Handouts
- Worksheet Handouts
- Letter Writing
- Teacher Use of Overhead Projector (Printed Information)
- Note Taking (from Reading)
- Note Taking (from Lecture)
- Activities/Problem Solving (in Writing)
- Marketing Simulation Workbooks
- Written Reports
- Form Completion
- Use of Graphs, Tables
- Textbook Chapter Exercises
- Library Research
- Word Puzzles
- Computer Quizzes/Tests
- Questionnaire Development
- Student-Generated Listing
- Computer Instruction Simulation
- Computer-Assisted Tutorial
- Learning Activity Packages (LAPS)
- Reading Assignment
- Radio Spot Production
- Brochure Development

Kinesthetic

- Student Demonstration
- Take Physical Inventory
- Plays, Skits

Olfactory

(none)

Note: Secondary indented and arranged by perceived effectiveness.

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addressed corresponding to the sequence of the study. The nominal data resulting from the study were used to answer the questions by ordering and classifying the instructional activities. The final product of this study is a compilation of the results of Phase I, Phase II, and previous MMPALT II research. The two-level framework for instructional reference was developed to address perceptual modality learning.

CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

This chapter presents a summary of the study, the major findings, and conclusions drawn from the findings. Based on literature review, findings, and conclusions, recommendations for application and implications are presented.

SUMMARY

The purpose of the study was to provide information useful for Marketing Education instructors in applying effective perceptual modality instructional techniques. The study determined the instructional activities perceived by Marketing Education instructors as being most effective and the perceptual style orientation of those activities. The result of the study was a perceptual modality instructional framework for use as an instructional resource.

The first research question was concerned with determining the most effective instructional activities as perceived by Marketing Education instructors. In Phase I of the study, a state-wide survey of the instructors was conducted using a list of instructional activities drawn from the Tennessee Curriculum Guide for Marketing Education. Instructors were asked to evaluate 62 instructional activities

as "effective," "not effective," or "not applicable" based on their experience in the classroom. The survey was conducted at each of five regional conferences held in the fall of 1993 at area universities. Of 138 instructors making up the survey population, 117 (85%) instructors returned their surveys for tabulation.

Percentages based on total instructor response were calculated for each of the "effective" choices. Results were ordered in a hierarchy for each of the three response categories.

The second research question was concerned with determining how experts in the field of perceptual modality classified the effective instructional activities (in Phase I) according to perceptual modality. In Phase II of the study, the Delphi Technique was employed to classify the instructional activities in this way. A panel of ten experts used the perceptual modality elements drawn from the Multi-Modal Paired Associates Learning Test, Revised (MMPALT II) to classify the 62 instructional activities. Panelists classified the activities according to seven perceptual modes: print, aural, interactive, visual, haptic, kinesthetic, and olfactory. Dominant and secondary classifications were considered for each activity. Summaries of panel response were recorded in percentages for dominant classification and in proportions for secondary assignments on each of three probes. All activities (63 rather than 62 after one activity was subdivided) were awarded dominant classifications by consensus of the panelists. Secondary classifications were obtained for 38 activities.

The third question was concerned with determining whether a framework could be developed to combine effective teacher-directed instructional activities and perceptual modality classification. Instructional activities were listed by dominant and secondary perceptual modality element and by level of effectiveness with highest "effective" percentages listed first. The modality element groups were also listed in hierarchy based on past MMPALT II research findings concerning the most predominant learning modes (James & Blank, 1991b). The perceptual modalities most prevalent in learners and used on the first level of the framework were visual, interactive, and haptic. The second group included aural, print, kinesthetic, and olfactory modes based upon secondary, ordered learner modality. These four elements became the second level of the framework. A third level was suggested, based on recommendations drawn from the literature and comments from the Delphi panel of experts. This proposed level of the instructional framework would allow learners a choice of activities by which to access new information or to reinforce learning through their own perceptual modality. The resulting framework with ordered perceptual modalities and effective activities can serve as a resource to instructors in guiding and individualizing classroom instruction.

MAJOR FINDINGS

This section presents a summary of results for Phase I, the instructor survey, and Phase II, the classification of instructional activities. The results of the combination of Phase I and Phase II are also presented in this section.

1. Ninety-five percent or 59 of the instructional activities were considered effective based on the responses of 50% or more of instructors completing the evaluation. Only three activities or 5% were considered by less than 50% of the instructors to be effective. The three activities include drawing and painting, use of a change maker machine, and use of records or compact discs. Based on the agreement of 85-89% of the instructors, 10 activities (16%) made up the largest group of effective activities.

2. The 12 activities (19%) evaluated as effective by 90% or more of the instructors were assigned a variety of dominant perceptual style elements. The activities include tests/quizzes/reviews, interview of the student, demonstration by the teacher, student demonstration, role play, teacher-directed group discussion, guest speaker, videotape, activities/problem solving (orally), information handouts, worksheet handouts, and teacher use of overhead projector--pictures. The activities include these perceptual modalities: three print, three aural, three interactive, one kinesthetic, and three visual. No haptic or olfactory activities were noted in this group of effective activities.

3. The two activities most often designated as "not effective" were later classified as a print and an aural activity: reading assignment and audiotape.

4. Of the nine activities in the top 15% of the "not applicable" activities, which reflected 30.2% to 56.6% of instructor agreement, eight require special equipment. Potential equipment needed includes computers, compact discs, and television and radio production facilities.

5. The perceptual modality classification of 63 instructional activities from the Tennessee Curriculum Guide for Marketing Education indicates that print is the most dominant element with 19 activities (29%), followed by the interactive element with 16 activities (24%), the visual element with 15 activities (23%), and the aural element with 10 (15%) activities. The predominant secondary element was the aural classification, which included 14 activities (35%) of the 40 activities selected for secondary dominance.

6. The classification process for instructional activities listed in the curriculum guide resulted in a small representation of element dominance for haptic and kinesthetic activities with three activities (4.5%) in each element group. Among secondary classifications, kinesthetic was not denoted as a secondary mode for any activity. No activities were classified as olfactory on either the dominant or secondary level.

7. As a confirmation of the perceptual modality classifications, the Delphi panel of experts rated their level of acceptance as high for the final classification assignments using dominant and secondary perceptual elements. The high

acceptance level for dominant activities was true for 93% of the panel members and was determined by combining the acceptance level of all activities for all panel members. Secondary element activities were rated as high in acceptance for 74% of the panelists, and 17% chose moderate acceptance of the classifications.

8. Written communication from the panel of experts both on the Delphi instruments and as response to interview questions was combined with the final classification results to compile discussion themes regarding perceptual modality classification. Issues that emerged from the Delphi exploration dealt with lack of agreement by the panelists on how to classify several different learner actions. An activity that required only the act of speaking was an issue for panel members because the original definition for "interactive" grouped both talking and listening. Most panel members linked the talking and listening actions by classifying them as predominantly interactive activities with aural as a secondary element. Of the 11 multi-modal activities classified as dominantly interactive, eight (73%) were classified as aural for secondary dominance.

Another question that panelists continued to debate was the classification of print versus haptic activities where writing or keyboarding was involved. Classification of the 15 pencil-and-paper (writing) activities resulted in their assignment as print. Three of those activities were designated as haptic for secondary classification. The three computer activities were ultimately viewed as dominantly visual or print rather than haptic. Panelists indicated that classification decisions would depend on the individual learner and would be

contingent on whether the exercise was new learning and whether it was based on the learner's muscle memory. Panelists also expressed another consideration: when a variety of instructional activities are offered, what the learner chooses is "learner-directed" and is usually his/her best mode for learning. For example, note taking from reading was ultimately classified as print, but if the learner chooses note taking as a way to remember information, it could be haptic for the haptic learner.

The issue of group activities resulted in several themes. Of the 14 group activities, 11 were classified as interactive. The informality of group activities allows more freedom or flexibility to the learner in modes of access. In group activities learners often choose to access the information through their own modes and still function as part of the group. It was suggested by panelists that individual activities should include some freedom to choose so that instructional activities are not limited to teacher-directed methods.

Summations may be made from panelists' comments and resulting classifications about the movement senses often included in group activities. Classification of kinesthetic and haptic activities may be determined by weighing the difference in gross and fine motor skills. Kinesthetic classification does not necessarily include walking as a learning mode when it is considered to be a method of transportation. The three activities classified as dominant kinesthetic involved limited learner walking and potentially more movement of other body parts.

When considering benefits to the learner, two issues were discussed by the panelists and are summarized. First of all, two different learners may access the same information within an instructional activity through two different modes, and each can benefit equally. An activity may be dominant in one mode but provide equal learning opportunities to two different types of learners. Secondly, a difference may exist between how information is presented versus how information is retained. If information is presented in print but is remembered in the visual mode, the question becomes, is learning stronger when elements of presentation and retention are paired?

9. When data from Phases I and II of the study were combined to create a framework for instructional use, activities representing six of the seven dominant perceptual modality elements were included. Dominant interactive activities comprised the largest group with 17 (50%) of the 34 activities listed in Level I. Level I includes the predominant modalities found among learners. The dominant haptic activities were least represented in Level I with 8.8% of the 34 activities listed for the perceptual instructional framework. Within Level II of the framework, which includes the less predominant modalities among learners, print activities comprised the largest group with 19 (59%) of the 32 activities in the second level. Kinesthetic activities made up the lowest representation with 9% of the 32 activities in the second level. No activities were classified as olfactory; therefore, no activities are listed in the framework for that element.

10. An analysis of the framework shows the dominant interactive element activities as the most effective (77.8%) based on the collective average of effectiveness of activities (Phase I) within each perceptual modality group. The haptic instructional activities, evaluated in a like manner, appeared to be the least effective (52.5%) of the three elements in Level I. In Level II, print activities were deemed most effective (75.3%) in the dominant classification. Activities classified as aural and kinesthetic, also in Level II, were equal in instructor agreement of effectiveness (72.8%). No olfactory activities were classified for the framework. (The researcher acknowledges possible skew of data by combining the percentages of effectiveness within each element group.)

11. When combining the dominant and secondary classifications for the final instructional framework, interactive activities continued to be evaluated as the most effective (76.7%) in Level I by instructors when each activity rating was combined for one group rating. Haptic was rated least effective (53.5%) in Level I. In Level II, aural activities were evaluated as most effective (76.3%), and kinesthetic were considered to be least effective (72.8%) but similar in effectiveness to the print activities (73.5%). It is acknowledged that some amount of distortion or skew may result when large number groups are compared to small number groups and when dominant and secondary elements are both included in the average. (The researcher acknowledges possible skew of data by combining the percentages of effectiveness within each element group.)

CONCLUSIONS

The following conclusions are based on the literature review and findings of the study:

1. The instructional activities provided in the curriculum guide, regardless of their perceptual style orientations, were considered to be effective by the majority of Marketing Education instructors.

2. The activity selection in the curriculum guide could be improved by a strong representation of all perceptual modality elements. More instructional activities are needed in the perceptual element modes of haptic, kinesthetic, and olfactory.

3. Based on past MMPALT II research, perceptual modality styles most predominant in learners are listed by hierarchy as visual, interactive, haptic, aural, print, kinesthetic, and olfactory. Perceptual dominant elements represented in the guide and listed in high frequency order are print, interactive, visual, aural, haptic, kinesthetic, and olfactory. When comparing the two areas, predominant learner styles versus perceptual elements represented in the curriculum guide, the representation of activities is not congruent with learner needs as determined by perceptual modality studies.

4. The Delphi process was effective as a convergence technique to analyze panelist input, to identify issues, and to classify the instructional activities.

RECOMMENDATIONS

Based on the review of literature and the major findings and conclusions of this study, the following recommendations are presented:

1. Marketing Education curriculum developers should seek to expand the range of activities listed in the Tennessee Curriculum Guide for Marketing Education. The guide should include more activities in haptic, kinesthetic, and olfactory perceptual element modes. Few of these types of activities appear in the current curriculum guide.
2. It is further recommended that the haptic, kinesthetic, and olfactory elements may be used to develop more multi-modal activities to be included in future curriculum development. The additional element modes could be combined with existing activities in the element group determined as most effective, interactive.
3. The study should be replicated in other curricular areas and in Marketing Education programs in other states to see if there are similar ratings for effectiveness of the instructional activities and their classifications for perceptual modality.
4. Further study is recommended in the area of paired perceptual element learning in which information is presented in one mode and retained in a different mode or when two modes are used by the learner simultaneously.

5. Another area for future study is the equal access to knowledge by different perceptual learners regardless of the classification order of dominant or secondary elements. In addition, learners may access information differently than indicated from the activities studied. No research has been done on these questions, and issues related to these questions were expressed by the study's Delphi panel of experts.

IMPLICATIONS

The process of improving the educational system and specifically instructional methods should center around the needs of the individual learner. By using appropriate instructional techniques, activities, and resources, educators may enhance learning and knowledge retention and maintain a positive learner mindset for future education. Instructors should continue to seek better ways to reach the changing student mind while balancing the concept of focusing on the individual who is often forced to learn in a large group setting. By providing instructors with an instructional resource that addresses the individual in each instructional activity, individualized instruction can be realized. With a perceptual modality instructional framework, instructors have a concise and effective resource for planning classroom instruction. The traditional delivery in secondary classrooms is often through the print and aural perceptual modes. Because this traditional format represents only the fourth and fifth level of "match" in

addressing student needs, many learners leave the class unserved in their perceptual potential. Low-level learning and low self-esteem are often the result. By changing or adapting instructional activities, instructional communication, and instructional environment, educators may open the minds of learners for success in learning and in life.

The results of the study and the review of literature generate the following implications:

1. The instructional environment or learning atmosphere may be enhanced based on information drawn from the enriched environment studies. This research links improved learning to active participation and to the atmosphere that is established to appeal to the sense of smell. Music may also be used to enhance the environment and in applied instruction.

2. The research in matched predicates between sender and receiver suggest that establishing strong communication patterns enhances learning. When used between instructor and learners, it will help to establish rapport and will allow more thorough directions and guidance during instruction. By using a variety of predicate forms which seek to "match" visual, aural, and kinesthetic perceptual elements, more learners are addressed simultaneously within the same group. The learner use of predicate forms and learner eye-movement evaluation can be used together with observation of the learner to help him/her determine perceptual modes for learning strength.

3. The findings of the study suggest that instructors should continue to evaluate effectiveness of the instructional activities in their own teaching situation and with individual learners. Instructors should be actively involved in seeking current instructional equipment and new or additional instructional activities to reach more learners based on their individual learning style needs.

4. The perceptual modality instructional framework can serve as a basis to evaluate needs in the curriculum guide for making it more useful as a resource in selecting and planning instructional activities. Instructional planners and instructors could use a variety of activities within a lesson to address different perceptual modes both for new information acquisition and for learning reinforcement.

5. The results of this study suggest that professional and staff development activities are needed in perceptual modality instructional concepts, the importance of using a variety of instructional activities, and the use of the perceptual instructional framework as a resource. The perceptual modality framework may serve as forerunner to MMPALT II studies which have not been conducted at the secondary level. It is additionally suggested that instructors have an opportunity to evaluate and rate their level of need for education about perceptual modality instruction.

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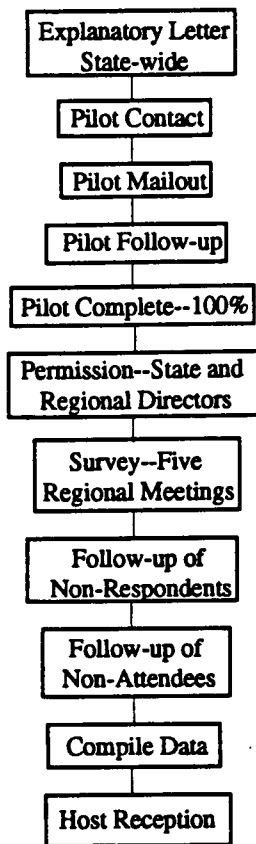
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APPENDICES

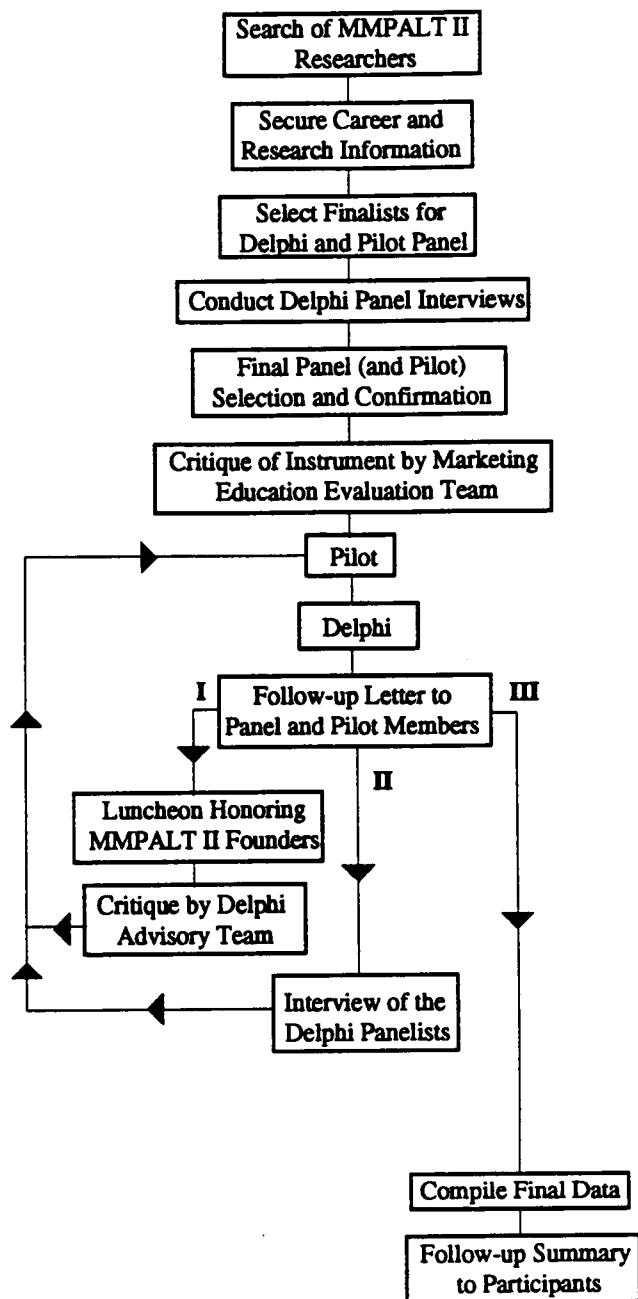
APPENDIX A
FLOWCHART OF BASIC RESEARCH PROCEDURES

Flowchart of Basic Research Procedures for Phase I and Phase II of Study

Phase I-Instructor Survey



Phase II-Delphi Panel of Experts



APPENDIX B

SURVEY OF EFFECTIVE INSTRUCTIONAL ACTIVITIES

Survey of Effective Instructional Activities for Tennessee Marketing Education Instructors

Please mark the following instructional activities as *effective*, *not effective*, or *not applicable (N/A)* in your experience as a Marketing Education classroom instructor. You are encouraged to list additional activities and their rating in the space provided. Please respond to each activity.

ACTIVITY	NOT EFFECTIVE	EFFECTIVE	N/A	ACTIVITY	NOT EFFECTIVE	EFFECTIVE	N/A
1. Audiotape	1	2	0	2. Role Play	1	2	0
3. Teacher-Directed Group Discussion	1	2	0	4. Brainstorming (as a Group)	1	2	0
5. Reading Assignment	1	2	0	6. Videotape	1	2	0
7. Note Taking	1	2	0	8. Television Program	1	2	0
9. Student-Directed Panel Discussion	1	2	0	10. Written Report (Research, Critique)	1	2	0
11. Drawing or Painting	1	2	0	12. Student Interview of Others	1	2	0
13. Use of Records, Compact Discs	1	2	0	14. Use of Graphs, Tables (Charting or Interpretation)	1	2	0
15. Recitation by Others	1	2	0	16. Use of Pictures, Photos	1	2	0
17. Student Demonstration	1	2	0	18. Use of the Telephone	1	2	0
19. Lecture	1	2	0	20. Demonstration by the Teacher	1	2	0
21. Oral Presentation (by the Student)	1	2	0	22. Guest Speaker	1	2	0
23. Interview of the Student (Job Interview)	1	2	0	24. Group Project (Poster, Collage, Mural)	1	2	0
25. Teacher Use of Overhead Projector—Printed Information	1	2	0	26. Teacher Use of Overhead Projector— Pictures, Artwork	1	2	0
27. Information Handouts (Vocabulary)	1	2	0	28. Worksheet Handouts (Matching, Calculations)	1	2	0
29. Student- Generated Listing	1	2	0	30. Tests, Quizzes, Reviews	1	2	0
31. Word Puzzles	1	2	0	32. Board and Card Games	1	2	0

ACTIVITY	NOT EFFECTIVE	EFFECTIVE	N/A	ACTIVITY	NOT EFFECTIVE	EFFECTIVE	N/A
33. Library Research	1	2	0	34. Activities/Problem Solving (In Writing)	1	2	0
35. Activities/Problem Solving (Orally)	1	2	0	36. Activities/Problem Solving (In Groups)	1	2	0
37. Form Completion (Loan)	1	2	0	38. Letter Writing (Application)	1	2	0
39. Collage, Poster Development	1	2	0	40. Questionnaire Development	1	2	0
41. Survey Conduction	1	2	0	42. Communication with a Business (in Person)	1	2	0
43. Slides with Audiotape	1	2	0	44. Radio Spot Production	1	2	0
45. TV Spot Production	1	2	0	46. Brochure Development	1	2	0
47. Display and/or Bulletin Board Construction	1	2	0	48. Films, Filmstrips	1	2	0
49. Taking of Physical Inventory	1	2	0	50. Cut/Paste Examples	1	2	0
51. Arrangement of Merchandise or Cash (School Store)	1	2	0	52. Plays, Skits	1	2	0
53. Computer-Assisted Tutorial (Change Making)	1	2	0	54. Computer Instruction Simulation (Jeans Factory)	1	2	0
55. Computer Quizzes/Tests	1	2	0	56. Learning Activity Packages (LAPS) - Self-Paced Module	1	2	0
57. Field Trip	1	2	0	58. Textbook Chapter Exercises	1	2	0
59. Debate	1	2	0	60. Cooperative Learning Groups	1	2	0
61. Marketing Simulation Workbooks	1	2	0	62. Change Maker Machine	1	2	0
63.	1	2	0	64.	1	2	0
65.	1	2	0	66.	1	2	0

Thank you for your help! This is a beginning step in identifying learning activities that are most effective for individual student's "senses" in learning.

APPENDIX C
DELPHI PANEL OF EXPERTS
AND ADVISORS

**Delphi Panel of Experts
for Classification of Instructional Activities by Perceptual Modality Element**

Dr. Russell French, University of Tennessee, Conceived the MMPALT Theory

Dr. Daryl Gilley, Walker Technical Institute, Conducted Original Research and Developed Instrument for MMPALT

Dr. C. Edwin Cherry, Helen Ross McNabb Center, Conducted Research and Developed Instrument for MMPALT II

Dr. Len Schaiper, Youngstown State University, Second to Conduct Research with the MMPALT II

Dr. Wayne James, University of South Florida, Supervised and Conducted the Most Research using the MMPALT II

Dr. William Blank, University of South Florida, Researched and Published Studies with James using the MMPALT II

Dr. Michael Galbraith, Florida Atlantic University, Published Studies with James using the MMPALT II

Dr. William S. Hutchison, University of South Florida, Conducted Dissertation Study using the MMPALT II

Dr. Lynn Grady, Polk County School System, Conducted Dissertation Study using the MMPALT II

Margaret Buckel, Martha Manson Academy, Tested with, Trained for, and Implemented the MMPALT II Throughout the Academy

Pilot Study Members

Dr. Linda Rice, MONARCH, INC., Dissertation using the MMPALT II

Fred Ryder, Ridge Technical Center, Education specialist thesis using the MMPALT II

Lisa Harden, Ridge Technical Center, Education specialist thesis using the MMPALT II

Marketing Education Advisors

Dr. Bill Barger
Marketing Education Instructor
Bearden High School
Knoxville, TN

Ann King
Curriculum Writer, Tennessee Curriculum Guide
Marketing Education Instructor
Maryville High School
Maryville, TN

Delphi Technique Advisors

Dr. Don McNelly
Director of Tennessee Vocational Evaluation Project
University of Tennessee
Knoxville, TN

Dr. Joyce Parker
Assistant Professor
Jefferson Community College
Watertown, NY

APPENDIX D

DELPHI-I

1203 Tapoco Avenue
Maryville, TN 37801
April 7, 1994

Dr. Daryl Gilley
Walker Technical Institute
265 Bicentennial Trail
Rock Spring, GA 30739

Dear Daryl:

Thank you again for your participation as a member of the Delphi panel of experts for the classification of instructional activities by perceptual modality elements. Please find enclosed

- * the study overview,
- * definition of perceptual modality element classifications,
- * projected time schedule,
- * informed consent statement and
- * the Delphi-I instrument.

I am asking panel members to return the completed instrument by April 16. Please feel free to contact me if you have questions regarding the study.

Sincerely,

Trish McCurry
University of Tennessee
Technological and
Adult Education
Doctoral Studies

Classification of Instructional Activities for Marketing Education by Perceptual Modality

Study Overview

This study seeks to serve as a foundation for an improved system of instructional delivery that will benefit students based on their perceptual modality learning style. The classification of effective instructional activities may serve as a first step in analyzing the instructional methods used in Marketing Education. The results of the study may be used in future curriculum development, in teacher education instruction, in teacher in-service training or in future research.

Objectives:

To determine the effective instructional activities used in Tennessee Marketing Education programs by conducting a state-wide survey of Marketing Education instructors. (Part I)

To determine the classification of the instructional activities used in Tennessee Marketing Education according to perceptual modality using the elements of the Multi Modal Paired Associates Learning Test (MMPALT II). The classification will be completed by a Delphi panel of experts. (Part II)

Definition of MMPALT II Elements:

Print- dependent upon reading and writing; gathering information primarily through the printed word.

Aural- dependent upon hearing; gathering information primarily through listening.

Interactive- dependent upon talking-discussing; gathering information primarily through discussion and talking with others.

Visual- dependent upon seeing; gathering information primarily through seeing pictures, images, objects, and activities.

Haptic- dependent upon touching; gathering information primarily through touching and/or holding.

Kinesthetic- highly mobile-active involvement; gathering information primarily through performance or engaging in body movements.

Olfactory- gathering information primarily through the sense of smell. (Gilley, 1975; Cherry, 1981)

Delphi Technique Guidelines

The Delphi Technique is a system of solicitation and collation of opinions in a decision-making process. It uses sequential questionnaires that are summarized and returned with group feedback on the responses to the previous instrument.

Delphi panel members are selected based on their expertise on the study topic. The number of members will depend on the investigator's or advising (staff) panel's decision.

Delphi panel members are to remain anonymous to each other during the study.

Delphi panel members generally respond by mail to questions that address the objective(s) of the study.

Responses are evaluated, summarized, and totaled. The resulting information is sent to the panel, and the members are again asked to respond to the questions, allowing for changes in opinions based on comments from other panel members.

Two or more probes may be used. The objective is to gain consensus on each issue or question. (Sackman, 1974; Delbecq 1975)

Projected Delphi Sequence

Delphi Advising Panel-	
Endorsement of First Probe Instrument	April 1
Delphi Panel of Experts-	
Completion of First Probe	April 16
Delphi Advising Panel-	
Endorsement of Second Probe Instrument	April 25
Delphi Panel of Experts-	
Completion of Second Probe	May 7

Delphi-I Completion Instructions

Identify the dominant element of perceptual modality for each instructional activity listed on the attached instrument by marking the appropriate column with a "1". For each activity that you consider to have more than one dominant element, denote the appropriate column with a "1" for the most dominant and a "2" for the second most dominant element.

In evaluating each activity, think in terms of the dominant element for classification purposes. For example, participating in a play or skit may require the student to read the script first, but you may not consider the activity to be a "print" activity when you evaluate the entire process of delivering a play.

Delphi-I

Perceptual Modality Classification for Instructional Activities

Please classify the following instructional activities as to their dominant perceptual modality. Use a "1" to indicate the strongest element type. If an activity involves two or three perceptual elements, classify those activities using "1" as most dominant and "2" as second most dominant. In that situation, comment on your reason for selecting the one modality as most dominant. You should assume that the student is participating in the described activity. To clarify some activities, an example is included in parentheses and a description is given in brackets. **Return date: April 16th.**

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinaesthetic 6	Olfactory 7	Comments
1. Audiotape								
2. Role Play [Acting assumed roles, spur of the minute, no script]								
3. Teacher-Directed Group Discussion [Teacher calls on students for answers or input]								
4. Brainstorming (as a Group)								
5. Reading Assignment								
6. Videotape								
7. Note Taking [From reading or teacher lecture]								
8. Television Program								
9. Student-Directed Panel Discussion [Student moderator, student participants]								
10. Written Report (Research or Critique)								
11. Drawing or Painting								
12. Student Interview of Others [Inside or outside the school, used in market research]								

ACTIVITY	Print 1	Audio 2	Interactivity 3	Visual 4	Haptic 5	Kinesesthetic 6	Olfactory 7	COMMENTS
13. Use of Records, Compact Discs								
14. Use of Graphs, Tables (Charting or Interpretation) [Physical charting of data and written explanation of graph]								
15. Recitation by Others [Listening to reports, explanations by other students]								
16. Use of Pictures, Photos [Either passed to students or projected to group]								
17. Student Demonstration [Sales demonstration, dressing a mannequin; action with oral explanation]								
18. Use of the Telephone [Calling to gather information, taking a message]								
19. Lecture [by teacher or guest]								
20. Demonstration by the Teacher [How to dress a mannequin, how to mix primary colors to get secondary colors]								
21. Oral Presentation (by the student) [Report before the class, may include visuals]								
22. Guest Speaker								

ACTIVITY	Oral 1	Audio 2	Interactive 3	Visual 4	Hands 5	Kineshetic 6	Observatory 7	COMMENTS
23. Interview of the Student (Job Interview) [Adult interviewing the student for a job, a loan, or on a TV show]								
24. Group Project (Poster, Collage, Mural) [Design, draft, construct original ideas]								
25. Teacher Use of Overhead Projector-Printed Information [Usually as a part of lecture]								
26. Teacher Use of Overhead Projector-Pictures, Artwork [Usually as a part of lecture]								
27. Information Handouts (Vocabulary) [Fact sheets, no questions asked]								
28. Worksheet Handouts (Matching, Calculations) [Requires student to write or show work]								
29. Student-Generated Listing [Individual activity, Example: list information usually found on a manufacturer's label]								
30. Tests, Quizzes, Reviews [Usually written responses]								
31. Word Puzzles [Crossword puzzles, word search]								
32. Board and Card Games								

ACTIVITY	Print 1	Aural 2	Interacting 3	Visual 4	Hands 5	Kinesthetic 6	Others 7	COMMENTS
33. Library Research [Using library search sources, interaction with library assistants]								
34. Activities/Problem Solving (In writing)								
35. Activities/Problem Solving (Orally) [Explanation given before the class]								
36. Activities/Problem Solving (In Groups) [Discussion in groups, often reported back to the class]								
37. Form Completion (Loan or Application Form) [Individual activity]								
38. Letter Writing (Application or Business Communication) [Individual activity, in students' own words]								
39. Collage, Poster Development [Individual activity, may use cut and paste or lettering]								
40. Questionnaire Development [Individual activity, used in market research surveys]								
41. Survey Conduction [Usually in person, contacting individuals, explaining the survey, collecting the surveys, tabulating data]								

ACTIVITY	Print 1	Audio 2	Interactive 3	Visual 4	Hands 5	Kinesesthetic 6	Olfactory 7	COMMENTS
42. Communication with a Business (in Person) [Call on business person to gather information for an assignment]								
43. Slides with Audiotape								
44. Radio Spot Production [Group activity; write script, rehearse, tape in class or at studio]								
45. TV Spot Production [Group activity; write, choreograph, rehearse, shoot]								
46. Brochure Development [Individual activity; write script, layout, format, develop art, proof, print]								
47. Display and/or Bulletin Board Construction [Small groups; Sketch layout, gather materials, construct]								
48. Films, Filmstrips								
49. Taking of Physical Inventory [Individual activity or in twos; Often used in school store to count, price, and total merchandise for auditing]								
50. Cut/Paste Examples [Individual activity; Use magazines, newspapers to show examples of the topic assigned]								

ACTIVITY	Print 1	Audio 2	Interactive 3	Visual 4	Hands 5	Kinesesthetic 6	Objective 7	COMMENTS
51. Arrangement of Merchandise or Cash (School Store) [Individual activity; Move merchandise for best selling, can include merchandise display. Arrange money in cash drawer properly]								
52. Plays, Skits [Used with groups, works from a script]								
53. Computer-Assisted Tutorial (Change Making) [Individual activity, computer shows pictures and words, then asks for student multiple choice answer]								
54. Computer Instruction Simulation (Jeans Factory) [Individual activity, computer uses graphics and words. The student must decide on labor, materials, payroll in order to produce a profit. Answers are open choice; a worksheet is used to record student decisions]								
55. Computer Quizzes/Tests [Similar to pencil/paper tests. Feedback is immediate, results are summarized]								
56. Learning Activity Packages (LAPS) Self-Paced Module [Student works from a folder of printed instructions. Instruction includes reading, puzzles, vocabulary words, and practice tests]								

ACTIVITY	Print 1	Audio 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7	COMMENTS
57. Field Trip [Students travel as a group to a site outside the school for observation purposes. An instructor or tour guide gives verbal remarks before or during trip]								
58. Textbook Chapter Exercises [Individual activity, writing answers to questions, defining words]								
59. Debate [One on one or in groups of two or three in front of the class, formal rules followed]								
60. Cooperative Learning Groups [Small groups with individual leadership titles, used for problem solving or for peer instruction]								
61. Marketing Simulation Workbooks [Students pretend they are in the business described and make decisions based on their marketing knowledge. Different roles are explored. Action, paper work processing, verbal interaction are included]								
62. Change Maker Machine [Individual activity, interact with equipment to indicate change to be given]								

APPENDIX E

DELPHI-II

1203 Tapoco Avenue
Maryville, TN 37801
June 16, 1994

Dr. Daryl Gilley
Walker Technical Institute
265 Bicentennial Trail
Rock Spring, GA 30739

Dear Daryl:

Thank you for your responses to the first probe for the Delphi classification of instructional activities. Your classifications and comments are included in the enclosed instrument along with other members of the panel. After you have had an opportunity to evaluate the compiled responses, please classify, a second time, the instructional activities according to the MMPALT II elements.

During this time of vacations and relaxed summer schedules, please make every effort to return the instrument by the proposed deadline. I am encouraging members to return the second probe by June 30th so that we may maintain a flow of recent ideas and communication.

Enclosed in this mailing are the

- * Delphi-II overview;
- * Delphi-II instrument, and the
- * return mail envelope.

If you did not retain a copy of your first probe and would like to see a copy, please call me at your earliest convenience: (615) 982-0053. Again, I appreciate your participation in this study. I will look forward to hearing from you soon.

Sincerely,

Trish McCurry
University of Tennessee
Technological and
Adult Education
Doctoral Studies

Delphi-II Overview

Objectives

The objectives of the enclosed Delphi-II instrument are to

- * see the percentage totals of panel classifications for each instructional activity,
- * evaluate summarized comments from panel members, and
- * re-evaluate your classification and make a second assessment of the instructional activity based on the information provided.

Revised Time Schedule

Pilot complete for Delphi-II	June 15
Delphi-II complete	June 30
Pilot complete for Confirmation Probe	July 12
Confirmation Probe complete	July 20

Guidelines for Delphi-II Completion

When completing this instrument, you may want to evaluate others' classifications and comments before classifying the activities for this second probe. In response to several comments, further explanation of some activities is given in double parentheses (()) following the activity description.

Please keep in mind as you mark the instrument that the

- * student is participating in the activity unless teacher action is denoted. Example: audiotape- student is listening to the tape, i.e., participating in the activity. Teacher demonstration: the teacher demonstrates as the student participates by observing.
- * instructional activity should be evaluated from the student perspective. Example: teacher use of overhead projector. Assuming that the student is participating or paying attention, classify the student activity rather than the teacher activity.
- * instructional activity is done by the individual (alone) unless stated implied (such as debate) or stated otherwise (in group).

* sequence of the series of events within an activity may or may not make a difference in the dominant classification of the instructional activity. Example: taking inventory in the school store may require the student to read about how to do it first. If the dominant part of the activity is the physical taking of the inventory or "doing," the preliminary reading may not be a significant part in the classification process. A student who does not want/like to read first can observe others and determine how to proceed. It is possible to gain from the inventory process without having read about it first.

General Comments:

Activities are listed only once, but some are similar in nature. They are not grouped in any particular order except that it is the same order used on the statewide teacher rating for effectiveness, separate from the Delphi study.

If the activity does not state that a related activity is taking place, do not assume that it is. Example: teacher lecture does not say taking notes, so classify the student perspective of listening to the lecture. Taking notes is listed as a separate activity. Additionally, filling out an application is not included with the job interview activity but rather has a separate activity listing.

Format of Delphi-II

This instrument will include the totaled responses from the Delphi-I and the summarized comments from panel members. Space is provided for your second classification of the instructional activity under each element. A separate line is provided for optional comments. You are encouraged to comment especially if your classification is different from the majority of other panel members.

Classification Summary:

The percentage listed under each modality is the total of "1's" or most dominant classifications. The percentages are rounded to the nearest whole percent. In cases where one panel member chose to list two "1" classifications, the total percentage reflects all "1's", so eleven rather than ten serves as the divisor.

The second most dominant modality was marked as a matter of choice by some panel members and not by others. Rather than show the "2" ratings by percentage, they are denoted by proportions: 3/5, which means 3 panelists out of a total of 5 responding chose that classification.

The third most dominant modalities are not reflected in this summary. A small percentage of the activities rated "3" classifications with usually one panelist and never more than two panelists responding. This data is available at your request.

Comment Summary:

Comments are listed exactly as respondents wrote them with two exceptions. If a word is need for clarity, I have inserted it in parentheses. If the comments were too lengthy to include each word written, I have summarized the comments which are also listed in parentheses. Each comment from a different panelist begins with a capital letter and is separated with a semicolon. Many comments simply endorsed the selected choice for classification.

Explanation of Activity Change:

The instructional activity of note-taking (#7) has been slightly restructured based on your input. The original note-taking activity listed on the initial teacher survey was not divided based on reading and lecture. It was retained on the Delphi-I in that format for continuity with the teacher survey. Based on the pilot and first probe, it is clear that the activity should be divided. If you consider both activities to be the same classification, you may mark them alike. If you consider them different, this second probe will give you an opportunity to mark them accordingly.

The note-taking activity information summary is broken into two parts: those treating it as one activity and those classifying it according to reading, then according to lecture, as given in the example. The resulting proportions are shown under each section. Please respond to the section marked 7a and 7b. A sample sheet is included for your convenience in interpreting information in instructional activity #7.

Delphi-II
Perceptual Modality Classification for Instructional Activities

Please classify the following instructional activities as to their dominant perceptual modality. Use a "1" to indicate the strongest element type. If an activity involves two or three perceptual elements, classify those activities using a single choice for "1", as most dominant and a single choice for "2" for second most dominant. Prior to marking your choice, consider the total Delphi panel classifications shown in percentages and ratios as well as comments made during the Delphi-I probe. Rate each activity using only one "1" classification and, if you wish, one "2" classification. Use the second block under each element heading to mark your response.
Return dates: June 30th.

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinaesthetic 6	Olfactory 7
1. Audiotape		100%		1/1			
Delphi-I Comments: Hearing is primary to its purpose.							
Delphi-II Comments:							
2. Role Play [Acting assumed roles, spur of the minute, no script] ((Students are seated or standing for roles, impromptu props are optional.))			60% 3/7	2/7		40% 2/7	
Delphi-I Comments: (The result of the role play is interactive; Involves primarily whole body; Discussion to define roles, visual feedback in observing other's; Movement is critical to this, verbalization runs second.)							
Delphi-II Comments:							
3. Teacher-Directed Group Discussion [Teacher calls on students for answers or input]		40% 3/5	60% 2/5				
Delphi-I Comments: Discussion is key; (1) Listening student; (2) Q & Answers are interactive; to the learner the verbalization is key.							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinaesthetic 6	Olfactory 7
4. Brainstorming (as a Group)		27%	64%	9%			
		2/3	1/3				
Delphi-I Comments: Brainstorming is not discussion. It is <u>listening</u> and <u>listing</u> all ideas; To the learner the verbalization is key.							
Delphi-II Comments:							
5. Reading Assignment	100%						
		1/2		1/2			
Delphi-I Comments: Aural for those who must "read aloud" to themselves.							
Delphi-II Comments:							
6. Videotape		9%		91%			
		6/6					
Delphi-I Comments: (Content could shift toward aural- "Talking Head"; Research suggests visual is dominant, but may not be true for all.)							
Delphi-II Comments:							
7. Note Taking [From reading or teacher lecture]	3/6 (1/5)	XX X	2/6 (3/5)	XX X	XX X	XX X	XX X
7a. Note Taking [From reading]	3/4 (1/1)		1/4				
7b. Note Taking [From teacher lecture]	2/4 (1/3)		1/4 (2/3)	1/4			
Delphi-I Comments: Separate into two groups; Bracket example is interactive; Sequence is the key, hearing first; student listens first, then writes; Process of creating print is the key; Divide based on bracket examples.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
8. Television Program		9%		91%			
Delphi-I Comments: (Possible that watching with others could become "interactive"; Sees first, then sound; Research suggests visual is dominant but may not be true for all.)							
Delphi-II Comments:							
9. Student-Directed Panel Discussion [Student moderator, student participants]		10%	90%				
		4/5	1/5				
Delphi-I Comments: (Assume the student is actively participating in the discussion; Listen then interact; Verbalization is key.)							
Delphi-II Comments:							
10. Written Report (Research or Critique) (The writing of the report may be hand-written or typed depending on the requirements of the teacher. Does not include the delivery of the report.)	80%			2/4	20%	1/4	
	1/4						
Delphi-I Comments: (Depends on how done, typing = haptic or writing; Print is read and typed is written.)							
Delphi-II Comments:							
11. Drawing or Painting				40%	40%	20%	
				2/6	3/6	1/6	
Delphi-I Comments: (Doing is haptic, but content will alter; smells involved may be considered; Difficult to decide between haptic and kinesthetic, defined by panelist: haptic = fine motor skills, kinesthetic = gross motor skills; Visualization to hands then to paper; Visual dominates for the learner; Visual is part of this activity.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
12. Student Interview of Others [Inside or outside the school, used in market research]		20%	80%				
Delphi-I Comments: (Listening then talking; The focus is on the response not the interaction.)		3/5	2/5				
Delphi-II Comments:							
13. Use of Records, Compact Discs		100%					
Delphi-I Comments:					1/1		
Delphi-II Comments:							
14. Use of Graphs, Tables (Charting or Interpretation) [Physical charting of data and written explanation of graph]	20%			50%	20%	10%	
Delphi-I Comments: (Act of doing and physical are keys; Interpretation is a print and visual task; Visual with print explanation; Visual is first, haptic is a distant second.)	4/9			3/9	2/9		
Delphi-II Comments:							
15. Recitation by Others [Listening to reports, explanations by other students]		100%		1/1			
Delphi-I Comments:							
Delphi-II Comments:							
16. Use of Pictures, Photos [Either passed to students or projected to group]				100%			
Delphi-I Comments: If passed, haptic.					1/1		
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
17. Student Demonstration [Sales demonstration, dressing a mannequin; action with oral explanation]	1/6	3/6	1/6	40%	1/6	60%	
Delphi-I Comments: (Kinesthetic for demonstration-visual/aural for observers; Assumed that is performing a "refer" demo. rather than watching another student perform demo; Student watches and listens; To the student doing it, the action is paramount; Aural is also a part of this demonstration; ? This is a performance?)							
Delphi-II Comments:							
18. Use of the Telephone [Calling to gather information, taking a message]	2/6	40%	60%				
Delphi-I Comments: (Calling = aural, message = print, talking = interactive; Listening comes first; Talking and listening. The emphasis is on what is heard.)							
Delphi-II Comments:							
19. Lecture [by teacher or guest]	1/2	100%		1/2			
Delphi-I Comments: (Other modalities are <u>distantly</u> related; Visual could be #2 if lecture has objects or pictures to demonstrate points.)							
Delphi-II Comments:							
20. Demonstration by the Teacher [How to dress a mannequin, how to mix primary colors to get secondary colors] ((Assume that a teacher demonstrating to a student would have verbal input as part of the demonstration.))	1/8	18% 6/8	9%	64% 1/8		9%	
Delphi-I Comments: (True demo = visual, teacher style and subject may alter somewhat; Explanation with demonstration would be a "2"; Watching while (usually) listening to words; What is seen is paramount.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
21. Oral Presentation (by the student) [Report before the class, may include visuals] ((Student is standing, often behind a lectern.))		20% 3/8	50%	10% 5/8		20%	
Delphi-I Comments: (The actual presentation itself; performance and doing is key; Kinesthetic for the student <u>doing</u> the demonstration.)							
Delphi-II Comments:							
22. Guest Speaker	1/3	90% 1/3		10% 1/3			
Delphi-I Comments: Visual could be #2 if speaker has visuals to demonstrate parts of speech.							
Delphi-II Comments:							
23. Interview of the Student (Job Interview) [Adult interviewing the student for a job, a loan, or on a TV show]		20% 2/5	70% 2/5			10%	
Delphi-I Comments: To the learner verbalization is the key; Print could also be #2 as student or adult must fill out application.							
Delphi-II Comments:							
24. Group Project (Poster, Collage, Mural) [Design, draft, construct original ideas] ((Students plan, then prepare by getting supplies usually in classroom, then cut, paste, letter, draw, paint or construct the final product.))			50%	6/8	50%	2/8	
Delphi-I Comments: (Keys here are "construct", use of hands (some whole body); Rough to distinguish haptic and kinesthetic (see #11 definition); Prep = interactive, project = kinesthetic; Discussion and seeing are keys; Could also be haptic and print.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
25. Teacher Use of Overhead Projector--Printed Information [Usually as a part of lecture]	90%	3/6		3/6	10%		
Delphi-I Comments: Reading- print (listening IF a lecture accompanies; When you bring in lecture you cloud the issue; Could be aural.)							
Delphi-II Comments:							
26. Teacher Use of Overhead Projector-- Pictures, Artwork [Usually as a part of lecture]	1/6	5/6		90%	10%		
Delphi-I Comments: Seeing and listening IF a lecture accompanies.							
Delphi-II Comments:							
27. Information Handouts (Vocabulary)[Fact sheets, no questions asked]	100%			1/2	1/2		
Delphi-I Comments: Content = print, if fuzzy paper = haptic.							
Delphi-II Comments:							
28. Worksheet Handouts (Matching, Calculations) [Requires student to write or show work] ((Individual activity, done on paper, while seated.))	70%			2/6	30%	2/6	
Delphi-I Comments: (Reception = print, action = kinesthetic; Could be either haptic or print; Reading, writing, typing, hand-held calculator.)							
Delphi-II Comments:							
29. Student-Generated Listing [Individual activity, Example: list information usually found on a manufacturer's label]	80%		10%		10%	2/2	
Delphi-I Comments:							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
30. Tests, Quizzes, Reviews [Usually written responses] ((Multiple choice, matching, short answer reviews and tests are provided in the curriculum.))	80%		10%		10%		
2/2							
Delphi-I Comments: Question type determines other involvements.							
Delphi-II Comments:							
31. Word Puzzles [Crossword puzzles, word search]	80%			10%	10%		
1/3					2/3		
Delphi-I Comments: Haptic if alone and seated.							
Delphi-II Comments:							
32. Board and Card Games ((Implies a small group, usually seated. Pictures and words may appear on board or cards.))	10%		30%	40%	20%		
1/7			1/7	3/7	2/7		
Delphi-I Comments: Reading and visual- picture on cards/game boards; Depends on what's on the board, cards.							
Delphi-II Comments:							
33. Library Research [Using library search sources, interaction with library assistants]	60%		20%	10%	10%		
1/9		1/9	5/9			2/9	
Delphi-I Comments: (Print is primary; Reading and talking with librarians; Interaction clouds the issue; Visual is also part of this activity.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinaesthetic 6	Olfactory 7
34. Activities/Problem Solving (In writing) (Example: the teacher hands the student a typed marketing problem. The student is asked to solve it in written format))	90%	1/5		3/5	10% 1/5		
Delphi-I Comments: Reception = print, problem solving strategy = visual/aural (sub-vocal); (Quiet broad)?							
Delphi-II Comments:							
35. Activities/Problem Solving (Orally) [Explanation given before the class] (Example: the teacher verbally describes a marketing problem. The student has time to plan, then verbally delivers the solution. Questions from the class would be optional.)		70%	30% 4/4				
Delphi-I Comments: Alone, with others?; Interactive (for #2) only if class may join in with questions.							
Delphi-II Comments:							
36. Activities/Problem Solving (In Groups) [Discussion in groups, often reported back to the class]		9%	91% 1/5				
Delphi-I Comments: Discussing, listening, presenting; Depends on role(s) of student participating.							
Delphi-II Comments:							
37. Form Completion (Loan or Application Form) [Individual activity]	90%			1/2	10% 1/2		
Delphi-I Comments: Some visual aspects.							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kineesthetic 6	Olfactory 7
38. Letter Writing (Application or Business Communication) [Individual activity, in students' own words]	90% 1/3			1/3	10% 1/3		
Delphi-I Comments:							
Delphi-II Comments:							
39. Collage, Poster Development [Individual activity, may use cut and paste or lettering] ((Students often use posterboard, butcher paper, colored markers, rulers, or bulletin board trim))	10%			50%	20%	20%	
Delphi-I Comments: (Cut and paste- haptic, lettering- print; Seeing comes first; Visualizes product, puts it together and sees; Probably visual- depends on content- some posters are all words.)							
Delphi-II Comments:							
40. Questionnaire Development [Individual activity, used in market research surveys] ((Student must determine information needed from the target market, then hand write, proof, and rewrite or type in final form))	90% 1/4			3/4	10%		
Delphi-I Comments:							
Delphi-II Comments:							
41. Survey Conduction [Usually in person, contacting individuals, explaining the survey, collecting the surveys, tabulating data]	2/6	18% 2/6	73% 2/6	9%			
Delphi-I Comments: (Tabulating data is probably print; Talk, listen, write; Depends on conductor's role- interactive or aural.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinaesthetic 6	Olfactory 7
42. Communication with a Business (in Person) [Call on business person to gather information for an assignment]	1/4	10% 2/4	90% 1/4				
Delphi-I Comments: (Aural) Primary focus is on information gathered.							
Delphi-II Comments:							
43. Slides with Audiotape ((Content on the slides would differ according to unit subject and production company. Assume a variety of picture and sound information.))	2/9	18% 6/9		73% 1/9		9%	
Delphi-I Comments: (Aural unless slides are primary content; Could be either visual or aural; Sees and listens; Research suggests visual is dominant, but may not be true for all.)							
Delphi-II Comments:							
44. Radio Spot Production [Group activity; write script, rehearse, tape in class or at studio]	17% 4/8		58% 1/8			25% 1/8	
Delphi-I Comments: (Prep = interactive, product = print & kinaesthetic; Writing = print, group = interactive, taping = aural; Writes script then interacts to produce/refine; Print, interactive, kinaesthetic being used, depends on people in group; Taping could be kinaesthetic.)							
Delphi-II Comments:							
45. TV Spot Production [Group activity; write, choreograph, rehearse, shoot]	13% 2/11		62% 1/11	8% 2/11		15% 4/11	
Delphi-I Comments: ("Group" implied as important in interactive rating; Prep = interactive, product = print & kinaesthetic; Writing = print, rehearse = kinaesthetic, group = interactive; Writes script then interacts to product; Print, interactive, visual, kinaesthetic being used, depends on people in group; Choreographing could be haptic and kinaesthetic.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Offactory 7
46. Brochure Development [Individual activity; write script, layout, format, develop art, proof, print]	64% 2/8			18% 5/8		18% 1/8	
Delphi-I Comments: (Prep = Kinesthetic and print; Writing = print, most = visual; Read first; Write and visual product; Mixed message--writing and art are different.)							
Delphi-II Comments:							
47. Display and/or Bulletin Board Construction [Small groups; Sketch layout, gather materials, construct]	10% 1/9		60%	30% 4/9		2/9	
Delphi-I Comments: (Prep = interactive, product development = kinesthetic and print; Small group = interactive, sketch layout = visual, gather and construct = haptic, overall = visual; Visual first-display; discuss then visualize; Visual is dominant in illustration.)							
Delphi-II Comments:							
48. Films, Filmstrips ((Pictures more than words are on secondary level films.))	1/5	9% 4/5		91%			
Delphi-I Comments: If there is sound track aural is #2.							
Delphi-II Comments:							
49. Taking of Physical Inventory [Individual activity or in twos; Often used in school store to count, price, and total merchandise for auditing] ((Indicates a physical counting of units for each item in the store. The cost is recorded and multiplied by units using a calculator.))	2/6	1/6	10% 1/6	20% 1/6	20% 1/6	50%	
Delphi-I Comments: (Counting = print?, math problems- don't know; (Visual) but some haptic might be involved; See and Write (keys); Mixed! Different styles used.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
50. Cut/Paste Examples [Individual activity; Use magazines, newspapers to show examples of the topic assigned]				60%	20%	20%	1/7
Delphi-I Comments: Smell of cut and paste could influence; Pictures (key to visual); See, cut, paste.							
Delphi-II Comments:							
51. Arrangement of Merchandise or Cash (School Store) [Individual activity; Move merchandise for best selling, can include merchandise display. Arrange money in cash drawer properly] (Students arrange merchandise attractively such as a spiral rack for T-shirts and for the best sales advantage such as "sale" items near the cash register. Money in the drawer arranged according to universal business policy.)				40%	50%	10%	
				1/6	2/6	3/6	
Delphi-I Comments: (Artistic/aesthetic- don't know; Ultimate "goal" = what it looks like; See, do are keys; Mixed- different styles; Kinesthetic because individual is moving merchandise.)							
Delphi-II Comments:							
52. Plays, Skits [Used with groups, works from a script] (Verbalization will vary depending on script used.)	4/10	1/10	36%			64%	
			2/10			3/10	
Delphi-I Comments: (Actors = kinesthetic; Script = print, skit = kinesthetic with some interactive, aural and haptic could be involved; "Performed" is the key; Discuss and do (keys); Depends on the amount of verbalization; Kinesthetic because of performance.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinaesthetic 6	Olfactory 7
53. Computer-Assisted Tutorial (Change Making) [Individual activity, computer shows pictures and words, then asks for student multiple choice answer] ((Verbal instructions or demonstration may be used to help students begin. They answer questions on the screen by using the keyboard. The screen displays the correct answer and goes to the next problem. Proportions of pictures to words will vary according to software.))	18% 5/9	9% 1/9	9%	64% 2/9	1/9		
Delphi-I Comments: Pictures = visual, words = print, computer keyboards = haptic (visual marked); Aural used for answer; Sees and reads; Depends on which form (pictures or words) one most used.							
Delphi-II Comments:							
54. Computer Instruction Simulation (Jeans Factory) [Individual activity, computer uses graphics and words. The student must decide on labor, materials, payroll in order to produce a profit. Answers are open choice; a worksheet is used to record student decisions] ((Verbal instructions and teacher demonstration may be used to get students started. Students then work independently to answer questions on the screen, via the keyboard, about profit related factors in this jeans business.))	36% 5/11	9%	9%	46% 5/11	1/11		
Delphi-I Comments: (What does touching keyboard play? Assume instruction is aural; Graphics = seen, words = read, calculation = reading/writing done; Depends on predominance of words or visuals; Aural and haptic are part of computer work.)							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
55. Computer Quizzes/Tests [Similar to pencil/paper tests. Feedback is immediate, results are summarized] ((Individual activity. Computer presents questions, student chooses from answers on the screen, uses keyboard to indicate answer, the correct choice is shown in the screen and a final score is given. Print is the most common format at this time.))	70%	2/4	20%	10% 1/4		1/4	
Delphi-I Comments: What part does touching keyboard play?; Similar to paper- pencil; You seem to assume a print format; Haptic is also a part of this activity.							
Delphi-II Comments:							
56. Learning Activity Packages (LAPS) Self-Paced Module [Student works from a folder of printed instructions. Instruction includes reading, puzzles, vocabulary words, and practice tests]	100%			2/2			
Delphi-I Comments:							
Delphi-II Comments:							
57. Field Trip [Students travel as a group to a site outside the school for observation purposes. An instructor or tour guide gives verbal remarks before or during trip]		36% 3/9		36% 2/9		27% 3/9	
Delphi-I Comments: Doing (key); Seeing and listening (key); Movement is key.							
Delphi-II Comments:							

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Kinesthetic 6	Olfactory 7
58. Textbook Chapter Exercises [Individual activity, writing answers to questions, defining words]	100%			1/2	1/2		
Delphi-I Comments: Print (key).							
Delphi-II Comments:							
59. Debate [One on one or in groups of two or three in front of the class, formal rules followed]		30%	60%			10%	
		3/5	2/5				
Delphi-I Comments: (Participants = interactive, observers = aural/visual; Not clear- participating or observing?; Interactive would be secondary but would exist between debaters; Listening is key, then interaction; Debaters hang on their comments and verbal case-making.)							
Delphi-II Comments:							
60. Cooperative Learning Groups [Small groups with individual leadership titles, used for problem solving or for peer instruction]	1/6	4/6	100%	1/6			
Delphi-I Comments: Talking and listening: Complex activity, most styles would be dominant at some point; Visuals are used in cooperative learning groups, print is also used.							
Delphi-II Comments:							

ACTIVITY	<u>Print</u> 1	<u>Aural</u> 2	<u>Interactive</u> 3	<u>Visual</u> 4	<u>Haptic</u> 5	<u>Kinaesthetic</u> 6	<u>Olfactory</u> 7
61. Marketing Simulation Workbooks (Students pretend they are in the business described and make decisions based on their marketing knowledge. Different roles are explored. Action, paper work processing, verbal interaction are included) ((Simulations usually involve the entire class, each student has a different role in "the company" that changes daily or weekly. A workbook helps in providing job descriptions and student tasks. Example: in Jeffreys Department Store students may "work" in the receiving department, then in accounts receivable, then in sales.))	50% 2/10	 1/10	30% 5/10	10% 1/10	 1/10	10%	
Delphi-I Comments: (Action is key; must read first, then discuss; Assume action means physical movement, "Workbook" implies more print, but could be interpreted several ways; reading, writing, discussion; Complex activity- sounds like print is dominant, interactive, aural, haptic next in order; Print would be a part.)							
Delphi-II Comments:							
62. Change Maker Machine (Individual activity, interact with equipment to indicate change to be given) ((Similar to an interactive computer screen; student indicates change to be given for amount of sale and amount tendered. Machine gives feedback as to correct answer.))	10%		10%	20% 1/3	60% 1/3	1/3	
Delphi-I Comments: I don't know what the equipment does -- print problem? -- I am assuming there is more; Seeing and doing.							
Delphi-II Comments:							

APPENDIX F

DELPHI-III

1203 Tapoco Avenue
Maryville, TN 37801
August 19, 1994

Dr. Daryl Gilley
Walker Technical Institute
265 Bicentennial Trail
Rock Spring, GA 30739

Dear Daryl:

This is the final Delphi probe for classification of instructional activities, and the results reflected in this iteration are quite informative. Consensus has been reached on the large majority of activity classifications, and the purpose of this probe is to confirm the elemental choice. Enclosed are the

- * Delphi-III Overview;
- * Delphi-III Perceptual Modality Classification for Instructional Activities; and
- * Self-Rating for Competence in MMPALT-II Classification.

Although the overview sheets appear lengthy, they may be reviewed quickly, and the Delphi instrument only requires a "check" for level of acceptance. Hopefully, this probe will be the least time consuming. I am requesting that you return the instrument by Tuesday, September 6th.

Please accept my sincere thanks for your participation in the study. Although the entire Delphi process has taken longer than first projected, there has been one hundred percent participation during each probe. Your input will contribute to the enrichment of instructional techniques and will further communicate the MMPALT-II theory of learning style.

Sincerely,

Trish McCurry
University of Tennessee
Technological and
Adult Education
Doctoral Studies

Delphi-III Overview

Objectives

The objectives of the enclosed Delphi-III instrument are to

- * see the chosen classifications by the Delphi panel for each instructional activity;
- * evaluate the comments from panel members on the instrument and in the follow-up interview section; and
- * re-evaluate your classification and mark your level of acceptance of the majority of panel members' choice for perceptual modality classification of each instructional activity.

Guidelines for Delphi-III Completion

Please keep in mind as you mark the instrument that the

- * activity should be evaluated from the student's perspective.
- * the eye can easily confuse aural and oral in the activity description. Aural is the sense of hearing, oral means spoken.
- * instructional activity is an individual activity unless the description denotes it as a group activity.
- * comments from panel members are separated with a ";" and the next comment begins with a capital letter. All comments are exact quotes; any words in parenthesis "(" have been inserted for clarification purposes.
- * the study is seeking to identify the dominant element for each instructional activity, recognizing that many activities are multi-sensory. A dominant element means that more of that sense is addressed or a larger percent of the activity is taken up with that element. If all perceptual elements are equally represented in the class, decide which element will reach more learners as a result of dominance of that element. It is understood that learners with the secondary element as their learning strength will still learn effectively.

General Comments:

In response to some of your comments and questions, it is true that some instructional activities seem redundant. For example, videotape and television program are modally the same, and thus, both do not need to be listed. The instructional activities are being retained from the original list used in the teacher survey (phase I of the study). From

a research design perspective, each activity needed to be included in both phases of the study. The teacher's evaluation of the activities' effectiveness (phase I) is often different for activities that the Delphi panel would judge as similar or in the same modality element classification.

Format of Delphi-III

Instructional activities of the same dominant perceptual modality element have been grouped together to assist the panel in seeing similarities or differences by classification. The dominant element will be denoted with a "1," and the second most dominant element is marked with a "2". At the end of each activity section, you are asked to mark your level of acceptance of the majority classification of that activity for both the "1" and "2" elements. The levels are high acceptance, moderate acceptance, low acceptance, and no acceptance. These responses may be weighted in the final analysis. If you do not accept the element selection of the majority of the panel, please write comments in the space provided.

One panel member has asked that the more complex activities be broken down into steps or areas that may be easier to evaluate. This additional information is given in double brackets, [[]], at the end of the activity.

In response to some requests an additional finding will be shown on this probe. The element that was one vote away from qualifying for the second classification element or that came in next (third place), will be denoted in parentheses, (), in multi-modal activities. The latter part of the instrument includes activities with two dominant element classifications, marked with two "1's."

The last section shows the instructional activities that were not classified by consensus of the panel. Those activities are marked with percentage and ratio votes as on the Delphi-II instrument. Please mark your selection again using one "1" and one "2." You will need to mark your choice in the small space immediately beside the percentage and ratio shown. If your choice is different from the majority of the panel, write comments in the space provided.

Definition of Elements:

Print- dependent upon reading and writing; gathering information primarily through the printed word.

Aural- dependent upon hearing; gathering information primarily through listening.

Interactive- dependent upon talking- discussing; gathering information primarily through discussion and talking with others.

Visual- dependent upon seeing; gathering information primarily through seeing pictures, images, objects, and activities.

Haptic- dependent upon touching; gathering information primarily through touching and/or holding.

Kinesthetic- highly mobile-active involvement; gathering information primarily through performance or engaging in body movements.

Olfactory- gathering information primarily through the sense of smell. (French, 1975; Gilley, 1975; Cherry, 1981)

Summary of Comments from Delphi-II Follow-up Interviews

Issue: Haptic versus Print

Questions about classifying a written activity such as note-taking, written report, and written problem solving may come down to differences in haptic (pushing pencil, touching paper) and creating print (writing).

* One panelist sees student-initiated writing, such as choosing to take notes, as a choice of a print learner. Print learners usually take pride in the neatness of their notes. Teacher-initiated (required) writing, such as a written report, may reveal the haptic learner with sloppy notes but learning from the experience of writing or typing the report.(3)

* Going back to the original definitions, a second panelist interpreted reading or writing as a print activity. Paraphrased: "When I think of haptic, I think of the MMPALT-II, where there is identification through holding or touching. One thing I am not clear about: my experience with the learning disabled shows that haptic learners can benefit from writing in the sand or on a textured surface, and that is one kind of print." (2)

* Another panelist sees this comparison as, "which came first, the chicken or the egg?" In most cases a writing activity would be creating print, then haptic by pushing the pen. Regarding computer activities when the keyboard is the method of creating print, he believes that haptic is first, then print. Consider the interactive element. Computer work is interactive (verbal or nonverbal) to some degree because of the sequence of responses and decision-making.(1)

* In choosing between print and haptic, another panelist judges which mode is taxed the most? Pencil movement in taking notes is usually automatic for a student. The new learning is the act of processing the print being written, so it is a print activity. The task of creating print (writing) may become haptic when the learner moves from an automatic response to concentrating on the form of the lettering. An example is large lettering on a poster or very small calligraphy. The mode for typing also goes back to experience. A veteran typist who composes while typing and checks the words on the screen while typing is using the print mode. For a first time typist, the activity may be haptic. The same pattern holds true for a learner reading braille; for the experienced learner it is a print activity. The key is recognizing what new is being learned, which mode is being "stretched?"(4)

* The next panelist said that an activity should not be classified as haptic unless new learning was taking place through the haptic element. "Just writing" is not haptic. The panel member pointed out that on the second probe, she marked more haptic and kinesthetic activities after reading others' comments from the first probe. Many of the computer activities are visual and haptic: visual with screen communication and haptic from keying in information.(6)

* The key to the print-haptic question is what is happening in the mind or what intellectual activity is taking place. If verbal words or abstract ideas are being transposed on paper, it is a print activity. On the other hand, an activity such as fingerpainting would be a haptic activity. Note-taking, writing, list-making kinds of activities are usually reinforcing another kind of information intake.(7)

* Haptic means "to take hold of," and examples through special education perspectives are "touch math" and learning concepts/words through tracing them in sand, cream, or sand textures. The fingers are the muscle memory. In a multi-sensory strategy, the new information may be presented through spoken or printed words, but how did the students learn it? Another example is new information presented as the printed word plus a picture. Although the print is important, the visual association may be the key to how it is retained. Use of the keyboard at a computer is a haptic activity.

For example, the difference between a note-taking activity and studying for a test is that the haptic person will write and rewrite his notes to learn them, whereas the print person will read over his original notes.(8)

* Generating print as in note-taking is a print activity based on the original definition. Just pushing a pencil is not feeling what you are learning, based on the MMPALT haptic experience. Typing is most likely a haptic activity because it is done by feel. The learner does not look at the print, as he/she would in writing. Fine motor skills versus gross motor skills is still an issue with which to deal.(9)

* The haptic learner does move muscles in a notetaking activity but is not "turned on" by generating print. (10)

Issue: Visual versus Print

* One panelist sees visual and print elements linked in some activities. Print would be useful in visualizing or recognizing a situation. An example is the visual "storyboard" generated from a printed script. Another example is note-taking. One word might bring up whole images, or symbols may be used to create visual memory board in a note-taking assignment. (1)

* Another panelist comments that print is the visual intake or producing of letters/words. Print activities may be highly symbolic or highly abstract in reading or writing. Visual activities involve interpreting or producing symbols/figures that resemble what they represent, such as a line drawing of machinery. (4)

* A link may exist between the interactive element and the aural element. In many activities, talking, discussing, and interviewing (usually interactive) also require listening (aural). I do not see a strong link between print and visual activities.(7)

* Although the correlation is low between print and visual in research studies, there is some overlap. From personal experience as a visual person, the visual element is used in print, in how the words are laid out on the paper. An example discussed was the activity of student-generated listing: e.g., list information on a manufacturer's label. (9)

Issue: Multi-Modal Activities

* A panel member explained that many activities could not be classified as one dominant element in perceptual modality. Rather, there should be two to three dominant classifications as in the case of a field trip. The trip is an equal visual and aural classification.(6)

* Another observation: activities may be classified as dominant in one element, but it is likely that the secondary classification may be just as dominant for that kind of learner. Example: a television program may be visual first and aural second from a classification standpoint. However, the aural learner may benefit just as much as the visual learner because he is accessing the information from his learning mode. It depends on the student.(7)

* Question: does learning become stronger if elements are paired? In the case of visual and haptic elements, the visual learner can feel the light bulb and identify it but will take a mental snapshot of it in order to retain the information. A system of mnemonics may be used to help a learner retain. The visual learner may visualize the drawing assignment before beginning and visually remember it after it is complete. The haptic learner may learn from doing the drawing. A board game that requires moving pieces will help the haptic learner; cards with pictures will benefit the visual learner. In a class with many types of learners, most activities cannot be classified only one way. The key here is not how the teacher presents the information, but how students can most effectively learn? (8)

* Many activities are multi-modal, and classification using only one "1" and one "2" becomes difficult. Deciding on a dominant classification really depends on the learner. Videotape is visual for the visual learner and aural for the aural learner. (10)

* That same thought was reflected by another panel member who wanted to identify all the elements addressed in an activity. The more complex activities, such as group project, could have print, haptic, and kinesthetic as "2s" in addition to interactive as "1." (6)

* One suggestion for the next probe is to refine the descriptions on the complex multi-modal activities so that basic elements of the activity are clearly separated by "confounding variable". This would assist the panel in clarifying, "What would grab me, the learner?" (10)

* In classifying multi-modal activities, one panelist sees it as a two-step process. First, what kind of message is being sent or what is the intention of the sender. Second, what is the sensory dominance of the learner. It is possible that an activity that does not "match" the "high" mode of the learner can still trigger another mode that is the "high" mode of the learner. Another consideration is that it is possible for a print learner to learn from arranging school-store merchandise (haptic and visual) because haptic or visual may be "moderate" modes for that print learner. (5)

* Other multi-modal observations: typically interactive is linked to aural because talking activities typically involve listening. Computer-related activities also tap several elements: a common link is haptic, visual and/or print. (9)

Issue: Group Projects versus Individual Activities

* If we assume that individual learners will access new information through their own element, we could assume that an aural learner would learn just as well from the videotape as the visual learner. So a multi-modal individual activity will address many styles, and in the eyes of the learner, those styles may be addressed equally. In a group activity the learner will (by chance, by choice, or by design) ultimately access the information by his own modal element. Example: in radio spot production, the print learner will probably write the script, the interactive learner will be the announcer, and the haptic/kinesthetic learner will operate the equipment. In summary, an individual activity, dictated by the curriculum or the teacher, may "force" the style of learning. In a group activity the learner will naturally access the information based on his/her style. (10)

* Another panelist agreed (to the above comments) but labeled the activities as "teacher-directed" often used for new learning, and "student-directed" used for reinforcement. (3)

* Group activities usually imply an interactive nature. Although learners may access the new information through their own, natural element, a certain amount of interaction must take place in order to coordinate the finished product. (9)

When is walking or body movement kinesthetic (as in a learning activity), and when is it transportation? Examples might include a field trip, television spot production, and the act of gathering supplies for constructing a display.

* Movements which represent something that must be remembered or retained would be kinesthetic. Example: if the objective of a field trip to a battle field is to read the historical markers, it might be a print activity. If the objective is to experience the rough terrain where the soldiers had trod, the activity would be kinesthetic. However, just the movement to walk to the battle field may free the mind enough to focus on the print (or other objective activity) for the kinesthetic learner.(7)

* Conflict exists in the research about this issue. Kinesthetic implies "doing," but it is the use of movement to teach the concept, not just going to the desk and getting the supplies. For some kinesthetic learners, it is important to move all the time (such as walking around the desk as they read.) An example of kinesthetic learning is to find a buddy and make the number four on the floor with your bodies. To teach "over" and "under," the teacher gives verbal directions and has the learner go under the slide and over the walk. In this multi-modal approach, the sequence is not important; the first element presented is not always necessarily important.(8)

* A walking activity is kinesthetic when it is related to learning. Walking around to do store inventory is not learning, but moving objects is important (kinesthetic).(9)

Issue: What Happens First

At what point is what happens first in the activity important to new learning? Examples include hearing in note-taking from teacher lecture, teacher demonstration of how to run the computer tutorial, or reading about how to take inventory before actually doing so.

* In multi-modal activities, what happens first does not necessarily mean it is a dominant element. The key in activities that address many styles is what is primary or predominant, not what comes first. (9)

* Another panelist stated that in a multi-modal activity, such as "note-taking from lecture or reading," that it is important to decide which sense "gets hit" first. Notes from lecture would be classified as aural and print. Notes from reading would be classified as print (in two ways). (5)

Other Observations

* A panelist noted that the classifications were different when I read them to her and we could talk than when she read the instructional activity description, originally, by herself. (She is interactive.)(6)

* Another panelist agreed that there is a definite difference in reading the Delphi instrument versus hearing and discussing the activities. Some amount of "panel skew" was acknowledged. (7)

* Two panelists underlined the importance of having activities that approach different styles and that the same method should not be required of each student. The instructional activity should be adapted both from a teacher-directed activity and student-directed activity perspective. (3, 10) (This will be reflected in the dissertation.)

Delphi-III

Perceptual Modality Classification for Instructional Activities

The results of the instructional activities classification probes are listed for each activity. Please check your level of acceptance with the majority of the panel members for each activity by responding to both the "1" and "2" classifications. Please comment if you do not accept the majority classification and you would choose a different element. Secondary classifications that totaled one less than the required consensus for secondary element classification are indicated as (2). Third level classifications are shown as (3). Return date: September 6th.

ACTIVITY	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	High Acceptance	Medium Acceptance	Low Acceptance	No Acceptance
1. (30) Tests, Quizzes, Reviews [Usually written responses] (Multiple choice, matching, short answer reviews and tests are provided in the curriculum.)	1							1			
						2		2			
DELPHI-II COMMENTS: This is still learning by doing. The testing part is different than learning; Given orally? from ditto? will respond assuming (activity) in written format; since activity is "usually" written, there is no interactive.											
COMMENTS:											
2. (27) Information Handouts (Vocabulary)[Fact sheets, no questions asked]	1							1			
								2			
DELPHI-II COMMENTS:											
COMMENTS:											
3. (28) Worksheet Handouts (Matching, calculations) [Requires student to write or show work](Individual activity, done on paper, while seated.)	1							1			
						2		2			
DELPHI-II COMMENTS: I still think the learning comes by "doing" w/hands.											
COMMENTS:											

ACTIVITY	Print 1	Aural 2	Interactive 3	Visual 4	Reading 5	Handwriting 6	Observation 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
4. (38) Letter Writing (Application or Business Communication)[Individual activity, in students' own words]	1				(2)			1			
DELPHI-II COMMENTS: I now agree.											
COMMENTS:											
5. (25) Teacher Use of Overhead Projector--Printed Information [Usually as a part of lecture]	1			(2)				1			
DELPHI-II COMMENTS: Print if alone. Aural if support for lecture.											
COMMENTS:											
6. (7a) Note Taking [From reading]	1							1			
DELPHI-II COMMENTS: Another variable can be how notes are taken: handwritten vs. typed. A third variable might be "why" am I taking notes. For recall? for reinforcement? I now think 1,2,3 for both as above.(7a and 7b were classified the same) This is a good one to discuss in depth with others; Am basing response on assumption that the items include -both the stimulus (i.e. reading or lecture) and the note taking response. If not, there would be no difference between a and b; 7a-Read first- note taking second- both seem to be print; Dominant activity by definition is note-taking (reading & listening would be secondary); The key is the note-taking. For learner, writing is the important part of the process.											
COMMENTS:											
7. (34) Activities/Problem Solving (In Writing) (Example: the student receives a typed marketing problem from the teacher. The student is asked to solve it in written format.))	1			(2)				1			
DELPHI-II COMMENTS: I now agree print; Print is dominant but haptic and visual play a part.											
COMMENTS:											

ACTIVITY	Prin 1	Acad 2	Interactivity 3	Visual 4	Reading 5	Handouts 6	Strategy 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
8. (61) Marketing Simulation Workbooks [Students pretend they are in the business described and make decisions based on their marketing knowledge. Different roles are explored. Action, paper work processing, verbal interaction are included] ((Simulations usually involve the entire class, each student has a different role in "the company" that changes daily or weekly. A workbook helps in providing job descriptions and student tasks. Example: in Jeffreys Department Store students may "work" in the receiving department, then in accounts receivable, then in sales.) [[1.Read job descriptions and tasks 2.paperwork and problem solving 3.interaction between "coworkers"]]	1							1			
			2					2			
DELPHI-II COMMENTS: Interaction unless reading is primary activity; Complex activity involves many styles; Probably 3 or more elements here too; Mixed activity.											
COMMENTS:											
9. (10) Written Report (Research or Critique) ((The writing of the report may be hand-written or typed depending on the requirements of the teacher. Does not include the delivery of the report.))	1							1			
								2			
DELPHI-II COMMENTS: I now agree w/print. Feedback should include both content and style; Does this include the research or just the "writing" of the report?; One must read in order to write- both are equally important- visual as also a part of the process.											
COMMENTS:											

ACTIVITY	Print 1	Audio 2	Language 3	Visual 4	Haptic 5	Blindfold 6	Efficient 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
10. (37) Form Completion (Loan or Application Form) [Individual activity]	1			(2)				1			
					(2)			2			
DELPHI-II COMMENTS: I agree.											
COMMENTS:											
11. (58) Textbook Chapter Exercises [Individual activity, writing answers to questions, defining words]	1							1			
				(2)				2			
DELPHI-II COMMENTS: Visual and haptic are a part of this activity.											
COMMENTS:											
12. (33) Library Research [Using library search sources, interaction with library assistant(s)]	1							1			
			2					2			
DELPHI-II COMMENTS: A tough one- most learning (new) is from print; Mixed activity again!											
COMMENTS:											
13. (31) Word Puzzles [Crossword puzzles, word search]	1							1			
					(2)			2			
DELPHI-II COMMENTS: This is still learning by doing. The testing part is different than learning. (Same as activity 30- marked haptic.)											
COMMENTS:											
14. (55) Computer Quizzes/Tests [Similar to pencil/paper tests. Feedback is immediate, results are summarized]	1							1			
			(2)					2			
DELPHI-II COMMENTS: I agree with Delphi-I comments- haptic is a part of this activity- visual is also a part of the activity- I don't see interaction here.											
COMMENTS:											

ACTIVITY	Final 1	April 2	Interim 3	Visual 4	Hands 5	Readings 6	Objectives 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
15. (40) Questionnaire Development [Individual activity, used in market research surveys]((Student must determine information needed from the target market, then hand write, proof, and rewrite or type in final form.))	1							1			
								2			
DELPHI-II COMMENTS: I now agree.											
COMMENTS:											
16. (29) Student-Generated Listing [Individual activity, Example: list information usually found on a manufacturer's label]	1							1			
					2			2			
DELPHI-II COMMENTS: I still think the learning comes by "doing" w/hands; No interactive.											
COMMENTS:											
17. (56) Learning Activity Packages (LAPS) Self-Paced Module [Student works from a folder of printed instructions. Instruction includes reading, puzzles, vocabulary words, and practice tests]	1							1			
								2			
DELPHI-II COMMENTS: I assume there are pictures in the puzzles?; May have a little visual, but seems minimal.											
COMMENTS:											

ACTIVITY	Read 1	Anal 2	Interactive 3	Visual 4	Hands 5	Expository 6	Observant 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
18. (5) Reading Assignment	1							1			
DELPHI-II COMMENTS: No, I don't agree (with Delphi-I "read aloud" comment)- still print; Agree with Delphi-I comment aural for those who must "read aloud" to themselves; Reading "aloud" is not truly part of reading assignment.											
COMMENTS:											
19. (46) Brochure Development [Individual activity; write script, layout, format, develop art, proof, print]	1							1			
				2				2			
DELPHI-II COMMENTS: The key is what's being learned and what is the student doing. This is a creative process; The kinesthetic and haptic (elements) are used to develop the art.											
COMMENTS:											
20. (22) Guest Speaker		1		(2)				1			
								2			
DELPHI-II COMMENTS:											
COMMENTS:											
21. (35) Activities/Problem Solving (Orally) [Explanation given before the class] ((Example: the student hears a marketing problem described by the teacher. The student has time to plan, then verbally delivers the solution. Questions from the class would be optional.))		1						1			
								2			
DELPHI-II COMMENTS: Interactive only if the class can question.											
COMMENTS:											

ACTIVITY	Point 1	Assess 2	Interacts 3	Visual 4	Reacts 5	Emotions 6	Stimulus 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
22. (19) Lecture [by teacher or guest]	1							1			
								2			
DELPHI-II COMMENTS:											
COMMENTS:											
23. (1) Audiotape	1							1			
								2			
DELPHI-II COMMENTS: Hearing is the dominant element; There is <u>NO</u> visual.											
COMMENTS:											
24. (15) Recitation by Others [Listening to reports, explanations by other students]	1							1			
								2			
DELPHI-II COMMENTS: Easy one.											
COMMENTS:											
25. (13) Use of Records, Compact Discs	1							1			
								2			
DELPHI-II COMMENTS: Why separate from audiotape?											
COMMENTS:											
26. (23) Interview of the Student (Job Interview) [The student is interviewed by an adult for a job, a loan, or on a TV show]	1							1			
	2							2			
DELPHI-II COMMENTS: I now agree interactive.											
COMMENTS:											

ACTIVITY	Prnt 1	Agnd 2	Interact 3	Visual 4	Expts 5	Exhibits 6	Shdary 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
27. (2) Role Play [Acting assumed roles, spur of the minute, no script] ((Students are seated or standing for roles, impromptu props are optional. Usually in small groups before the class.))			1					1			
						(2)		2			
DELPHI-II COMMENTS: Yes- this can be thought of as "simulation" > guided or unguided practice of future; Interactive assumes talking and seeing (visual) movement follows; Role play is interacting with each other.											
COMMENTS:											
28. (36) Activities/Problem Solving (In Groups) [Discussion in groups, often reported back to the class]			1					1			
		2						2			
DELPHI-II COMMENTS: (Aural) is #2 if groups report back to class.											
COMMENTS:											
29. (4) Brainstorming (as a Group)			1					1			
		2						2			
DELPHI-II COMMENTS: If student is passive it can be aural. True brainstorming is interactive.											
COMMENTS:											
30. (21) Oral Presentation (by the student) [Report before the class, may include visuals] ((Student is standing, often behind a lectern.))			1					1			
				2				2			
DELPHI-II COMMENTS: Kinesthetic for the student <u>doing</u> the demonstration; A non-interactive learner can be expected to do poorly; If there is no interaction by other students, I do not believe this is interactive; The student doing it is the focus- not the students listening or watching.											
COMMENTS:											

ACTIVITY	Time 1	Agree 2	Disagree 3	Visual 4	Expects 5	Expects 6	Obtains 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
31. (42) Communication with a Business (In Person) [Call on business person to gather information for an assignment]		2	1					1			
DELPHI-II COMMENTS:											
COMMENTS:											
32. (60) Cooperative Learning Groups [Small groups with individual leadership titles, used for problem solving or for peer instruction]		(2)	1					1			
								2			
DELPHI-II COMMENTS: I agree with Delphi-I statement underlined (visuals are used in cooperative learning groups, print is also used); Mixed activity.											
COMMENTS:											
33. (47) Display and/or Bulletin Board Construction [Small groups; sketch layout, gather materials, construct]			1	2	2			1			
								2			
DELPHI-II COMMENTS: Don't feel good about this one being primarily interactive.											
COMMENTS:											
34. (12) Student Interview of Others [Inside or outside the school, used in market research]		2	1					1			
								2			
DELPHI-II COMMENTS: Student is interviewing to learn; therefore, could also work for aural learner.											
COMMENTS:											

ACTIVITY	Task 1	Aural 2	Interactive 3	Visual 4	Reading 5	Expository 6	Objective 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
35. (41) Survey Conduction [Usually in person, contacting individuals, explaining the survey, collecting the survey, tabulating data]			1					1			
		2						2			
DELPHI-II COMMENTS: Collecting surveys tabulating data would be print; Tabulating data makes it a mixed activity.											
COMMENTS:											
36. (9) Student-Directed Panel Discussion [Student moderator, student participants]			1					1			
		2						2			
DELPHI-II COMMENTS: Student level of activity is critical. Must be motivated & involved; Interaction seems to be dominant- listening sparks the interaction.											
COMMENTS:											
37. (45) TV Spot Production [Group activity; write, choreograph, rehearse, shoot]			1					1			
	(2)					(2)		2			
DELPHI-II COMMENTS: There are 3 modalities on this one also; Mixed activity.											
COMMENTS:											
38. (59) Debate [One on one or in groups of groups of two or three in front of the class, formal rules followed]			1					1			
		2						2			
DELPHI-II COMMENTS: Interactive comes from listening to each other- so it could be aural (1) and interactive (2) (this is the reverse of what is marked.)											
COMMENTS:											

ACTIVITY	Expt 1	Aural 2	Intuitive 3	Visual 4	Reading 5	Discussion 6	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
39. (44) Radio Spot Production [Group activity; write script, rehearse, tape in class or at studio]	2		1				1			
DELPHI-II COMMENTS: A mixed activity- writing changes it!										
COMMENTS:										
40. (20) Demonstration by the Teacher [How to dress a mannequin, how to mix primary colors to get secondary colors] ((Assume that a student would hear verbal input from the teacher as part of the demonstration.))				1			1			
		2					2			
DELPHI-II COMMENTS: Must teach teacher how to demo without too much talk; Aural and visual would be the dominants here; You cloud the issue with the verbal input- it's 2 activities. Notice your emphasis is <u>watching</u> !										
COMMENTS:										
41. (6) Videotape		2		1			1			
							2			
DELPHI-II COMMENTS: Second dominant would be the audio part of videotape.										
COMMENTS:										
42. (26) Teacher Use of Overhead Projector--Pictures, Artwork [Usually as a part of lecture]				1			1			
							2			
DELPHI-II COMMENTS: Print if alone. Aural if support for lecture.										
COMMENTS:										

ACTIVITY	Print 1	Aural 2	Automatic 3	Visual 4	Maps 5	Flashed 6	Oblique 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
43. (8) Television Program		2		1				1			
DELPHI-II COMMENTS: Same as videotape- why include separately; Visual is dominant but aural is also a part of the process.											
COMMENTS:											
44. (16) Use of Pictures, Photos [Students pass pictures or view them from a projector.]				1				1			
								2			
DELPHI-II COMMENTS:											
COMMENTS:											
45. (14) Use of Graphs, Tables (Charting or Interpretation) [Physical charting of data and written explanation of graph] [(1.Draw graph or chart 2.label parts 3.explain in writing)]	2			1	(3)			1			
								2			
DELPHI-II COMMENTS: "Use" is key word. Is this interpreting graphs or producing them- quite separate?; Visual is the dominant (element) with print and haptic also important; "Physical charting" = complicates things; There's a problem in the way you define it. Learning from charting is different from learning from writing. Further the person who learns from a chart is different from one who learns from a written explanation.											
COMMENTS:											
46. (48) Films, Filmstrips ((Pictures more than words are on secondary level films.))		2		1				1			
								2			
DELPHI-II COMMENTS:											
COMMENTS:											

ACTIVITY	Final 1	Assess 2	Interacts 3	Visual 4	Haptic 5	Emotional 6	Stimulus 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
47.(39) Collage, Poster Development [Individual activity, may use cut and paste or lettering] ((Students often use posterboard, butcher paper, colored markers, rulers, or bulletin board trim))				1				1			
					2			2			
DELPHI-II COMMENTS: The key is- what is being learned for the first time?											
COMMENTS:											
48.(50) Cut/Paste Examples [Individual activity; Use magazines, newspapers to show examples of the topic assigned]				1				1			
					2			2			
DELPHI-II COMMENTS: I stick w/haptic; All 3- visual, haptic and kinesthetic are a part of this activity- smell of paste is possible for olfactory; Cut is somewhat different from paste, because of odor!											
COMMENTS:											
49.(54) Computer Instruction Simulation (Jeans Factory)[Individual activity, computer uses graphics and words. The student must decide on labor, materials, payroll in order to produce a profit. Answers are open choice; a worksheet is used to record student decision] ((The student may receive verbal instructions or demonstration from the teacher to start the simulation. Students then work independently to answer questions on the screen, via the keyboard, about profit related factors in this jeans business.))	2			1				1			
[[1.Observe pictures or graphs 2.observe words or numbers 3.make decisions, respond by keyboard]]								2			
DELPHI-II COMMENTS: I stick w/visual. Some get complicated. It might be easier to design it to fit a learning style; Print appears dominant- aural would be verbal instructions- the screen would be visual and its use would be haptic; Probably has 3 modalities also; Mixed activity as written!											
COMMENTS:											

ACTIVITY	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
50.(33) Computer-Assisted Tutorial (Change Making) [Individual activity, computer show pictures and words, then asks for student multiple choice answer] ((Students may receive verbal instructions or teacher demonstration to begin the simulation. They answer questions on the screen by using the keyboard. The screen displays the correct answer and goes to the next problem. Proportions of pictures to words will vary according to software.))	2			1				1			
DELPHI-II COMMENTS: I do not see any interactive mode here; This one has 3 modalities!											
COMMENTS:											
51.(43) Slides with Audiotape ((Content on the slides would differ according to unit subject and production company. Assume a variety of picture and sound information.))		2		1				1			
DELPHI-II COMMENTS:											
COMMENTS:											
52.(51) Arrangement of Merchandise or Cash (School Store) [Individual activity; Move merchandise for best selling, can include merchandise display. Arrange money in cash drawer properly] ((Students arrange merchandise attractively such as a spiral rack for T-shirts and for the best sales advantage such as "sale" items near the cash register. Money in the drawer arranged according to universal business policy.)) [[1.Physical moving of items 2.visual appraisal]]					1			1			
				2				2			
DELPHI-II COMMENTS: Impossible to rate! You've created a very mixed activity.											
COMMENTS:											

ACTIVITY	Print 1	Audio 2	Interactive 3	Visual 4	Events 5	Emotions 6	Choices 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
53. (62) Change Maker Machine [Individual activity, interact with equipment to indicate change to be given] (Similar to an interactive computer screen; student indicates change to be given for amount of sale and amount tendered. Machine gives feedback as to correct answer.)				2	1			1			
DELPHI-II COMMENTS: Haptic if actual change. Visual if on a screen; This one is still not clear, sounds mostly visual, but print & haptic may be there too.											
COMMENTS:											
54. (17) Student Demonstration [Sales demonstration, dressing a mannequin; action with oral explanation]						1		1			
DELPHI-II COMMENTS: I stick w/ my original (choice); The student demonstrator is using kinesthetic and visual- aural and visual is what others are doing; If student is doing the explaining, the 2nd modality becomes interactive; What's demonstrated makes the difference- demonstration if I do it is a visual or kinesthetic form. If I add explanation, I change it.											
COMMENTS:											
55. (52) Plays, Skits [Used with groups, works from a script]((Verbalization will vary depending on script used.))			2			1		1			
DELPHI-II COMMENTS: Actors using script= print - difficult to say kinesthetic is the most dominant - all marked seem to have a part - maybe all should be 1's.											
COMMENTS:											

ACTIVITY	Print 1	Aural 2	Interactions 3	Visual 4	Reading 5	Expository 6	Offshoot 7	High Acceptance	Medium Acceptance	Low Acceptance	No Acceptance
56. (3) Teacher-Directed Group Discussion [Students are called on by the teacher for answers or input]	1	1						1			
	2							2			
DELPHI-II COMMENTS: A potentially dangerous area. If teacher centered (fountain of knowledge), it is clearly aural. Teachers can be misled to believe students are more active than they really are. If truly students center thought and activity could possibly be interactive; Discussion is dominant-listening is a part of student activity.											
COMMENTS:											
57. (57) Field Trip [A group activity where students travel to a site outside the school for observation purposes. An instructor or tour guide gives verbal remarks before or during trip]	1			1				1			
	(2)							2			
DELPHI-II COMMENTS: I now think interactive because of dynamic content; Kinesthetic does not apply-- walking around is not a kinesthetic element; Mixed activity as written.											
COMMENTS:											
58. (18) Use of the Telephone [Calling to gather information, taking a message]	1		1					1			
			2					2			
DELPHI-II COMMENTS: All above are secondary, (implying print and aural.)											
COMMENTS:											

ACTIVITY	Expt 1	Expt 2	Expt 3	Visual	Haptic	Kinesthetic	Observation	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
59. (7b) Note Taking (From teacher lecture)	30% 3/8	50% 3/8	10% 1/8	10% 1/8	10%			XXXXX	XXXXX	XXXXX	XXXXX
DELPHI-II COMMENTS: Another variable can be how notes are taken; handwritten vs. typed. A third variable might be "why" am I taking notes. For recall? for reinforcement? I now think 1,2,3 for both as above. (7a and 7b were classified the same) This is a good one to discuss in depth with others; Am basing response on assumption that the items include both the stimulus (i.e. reading or lecture) and the note taking response. If not, there would be no difference between a. (from reading) and b. (from lecture); I can now guess that note taking is a way for an interactive learner to engage either print or aural instruction; Hearing is dominant- Note taking is in print form; Dominant activity by definition is note taking (reading & listening would be secondary.); The key is the note taking. For the learner, writing is the important part of the process.											
COMMENTS:											
60. (11) Drawing or Painting				27% 5/8	55% 3/8	18%		XXXXX	XXXXX	XXXXX	XXXXX
DELPHI-II COMMENTS: (Response to gross motor skill= kinesthetic was "must be up and moving"); I stick w/haptic, but this may also be the interactive level for the visual learner. Haptic and kinesthetic as defined by panelist are dominant here- then visual is next in my opinion; Here the primary emphasis for the learning is not the doing, but the reconstruction of a visual image. The haptic learner may gain from this, but generally the haptic prefers and thrives on manipulation.											
COMMENTS:											
61. (24) Group Project (Poster, Collage, Mural) [Design, draft, construct original ideas] ((Students plan, then prepare by getting supplies usually in classroom, then cut, paste, letter, draw, paint or construct the final product.)) [[1.Group discuss 2.plan/sketch ideas 3.gather supplies 4.construct]]	1/8		67% 1/8	1/8	33% 3/8	2/8		XXXXX	XXXXX	XXXXX	XXXXX
DELPHI-II COMMENTS: I now agree interactive, but could be skewed by content and products; Too many possibilities: is group reading? (print), viewing videos (visual), constructing something (haptic, kinesthetic), etc.?; Students plan together is interactive- then haptic and kinesthetic come into play- print would come into play in connection with the planning; Also think 3 modalities are at work here; The way you have established this, I can't rate it. It will be a very different learning activity for each member of the group, depending on his/her style.											
COMMENTS:											

ACTIVITY	Final 1	Unit 2	Interactions 3	Visual 4	Events 5	Relationships 6	Officer 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
62. (32) Board and Card Games ((Implies a small group, usually seated. Pictures and words may appear on board or cards.)) [[1.Interaction is allowed 2.movement of pieces/cards is expected 3.pictures, words,numbers, and color are used]]	9% 2/9		18% 3/9	55% 3/9	18% 1/9			XXXXX XXXXX	XXXXX XXXXX	XXXXX XXXXX	XXXXX XXXXX
DELPHI-II COMMENTS: More than 2 modalities here; You've created a mixed activity- group has little to do with this!											
COMMENTS:											
63. (49) Taking of Physical Inventory [[Individual activity or in twos; Often used in school store to count, price, and total merchandise for auditing] ((Indicates a physical counting of units for each item in the store. The cost is recorded and multiplied by the units using a calculator.)) [[1.Arrange items 2.count and record 3.compute price extensions]]	1/8		2/8	30%	10% 3/8	60% 2/8		XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX	XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX	XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX	XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX
DELPHI-II COMMENTS: Physical counting of units = kinesthetic - cost is recorded if by hand (=) haptic - if more than one does this it would be interactive; Kinesthetic vs. haptic in use of calculator; Your definitions make it a mixed activity.											
COMMENTS:											

APPENDIX G
DELPHI-III SUMMARY

Delphi-III **Perceptual Modality Classification for Instructional Activities**

Result Summary

The results of the instructional activities classification probes are listed for each activity. Please check your level of acceptance with the majority of the panel members for each activity by responding to both the "1" and "2" classifications. Please comment if you do not accept the majority classification and you would choose a different element.

ACTIVITY	Panel #1	Panel #2	Intermediate #3	Visual #4	Haptic #5	Discrete #6	Abstract #7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
1. (30) Tests, Quizzes, Reviews [Usually written responses] ((Multiple choice, matching, short answer reviews and tests are provided in the curriculum.))	1							1 100%			
					2			2 30%	40%	20%	10%
DELPHI-III COMMENTS: Responding by "writing" really does <u>not</u> meet your definition of haptic.											
COMMENTS:											
2. (27) Information Handouts (Vocabulary)[Fact sheets, no questions asked]	1							1 100%			
								2			
DELPHI-III COMMENTS: What happened to #2? Usually there are pictures, figures, drawings, etc. making it heavy visual; This should be a "solid" response with complete agreement by the panel.											
COMMENTS:											
3. (28) Worksheet Handouts (Matching, calculations) [Requires student to write or show work]((Individual activity, done on paper, while seated.))	1							1 100%			
					2			2 60%	20%	20%	
DELPHI-III COMMENTS: Think #2 is more visual than haptic since relationships on paper (size, shape, etc.) are at play. Actual haptic movement of pencil/pen is minimal; See #1 but types of activities may vary more.											
COMMENTS:											

ACTIVITY	Total 1	Aural 2	Interactive 3	Visual 4	Haptic 5	Read/write 6	Consistent 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
4. (38) Letter Writing (Application or Business Communication)[Individual activity, in students' own words]	1							1 100%			
								2			
DELPHI-III COMMENTS: According to printed definition of visual in Delphi-III visual should not be considered except for the part dependent on seeing. There may be some visual here but it is definitely secondary.											
COMMENTS:											
5. (25) Teacher Use of Overhead Projector--Printed Information [Usually as a part of lecture]	1							1 90%	10%		
								2			
DELPHI-III COMMENTS: What was on the overhead? What if the teacher reads the overhead aloud-then aural/ff images then visual; Almost always, verbal explanation of text on the transparency is a part, only sometimes is there any interaction; There can be no aural--use of interactive means use of another method or technique.											
COMMENTS:											
6. (7a) Note Taking [From reading]	1							1 90%	10%		
								2			
DELPHI-III COMMENTS: Still think "dominant activity by definition is note taking" is still appropriate.											
COMMENTS:											
7. (34) Activities/Problem Solving (In Writing) ((Example: the student receives a typed marketing problem from the teacher. The student is asked to solve it in written format.))	1							1 100%			
								2			
DELPHI-III COMMENTS: Same comment as #4--I also agree with Delphi-II comment (print is dominant but haptic and visual play a part): Visual may play a part but not strong in most cases.											
COMMENTS:											

ACTIVITY	Total 1	Anal 2	Interactions 3	Visual 4	Events 5	Elements 6	Officers 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
8. (61) Marketing Simulation Workbooks [Students pretend they are in the business described and make decisions based on their marketing knowledge. Different roles are explored. Action, paper work processing, verbal interaction are included] ((Simulations usually involve the entire class, each student has a different role in "the company" that changes daily or weekly. A workbook helps in providing job descriptions and student tasks. Example: in Jeffreys Department Store students may "work" in the receiving department, then in accounts receivable, then in sales.) ([1. Read job descriptions and tasks 2. paperwork and problem solving 3. interaction between "coworkers"]]	1		2					1 80%		20%	
DELPHI-III COMMENTS: Workbooks have to be read first--then interactive takes place- I agree it is complex; visual is important here; Still think 3 or more elements belong here.											
COMMENTS:											
9. (10) Written Report (Research or Critique) ((The writing of the report may be hand-written or typed depending on the requirements of the teacher. Does not include the delivery of the report.))	1							1 90%	10%		
								2			
DELPHI-III COMMENTS: Visual important here; Visual may be a small part, but it's secondary.											
COMMENTS:											

ACTIVITY	Test 1	Assess 2	Interact 3	Visual 4	Haptic 5	Eliminate 6	Observe 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
10.(37) Form Completion (Loan or Application Form) [Individual activity]	1							1 100%			
								2			
DELPHI-III COMMENTS: Same as #4 comment (first listed); Probably some visual but secondary.											
COMMENTS:											
11.(38) Textbook Chapter Exercises [Individual activity, writing answers to questions, defining words]	1							1 100%			
								2			
DELPHI-III COMMENTS: Same as #4 comment (first listed); Visual is probably less here than in #10 above because of descriptions in [].											
COMMENTS:											
12.(33) Library Research [Using library search sources, interaction with library assistants]	1							1 100%			
			2					2 30%	40%	30%	
DELPHI-III COMMENTS: Haptic could be a part of this, as libraries use computers for search, "gathering information through touch"; Visual is important in navigating through library and materials. Very often happens without contact with library asst's; Interaction with assistants is a "low level" engagement in most cases.											
COMMENTS:											
13.(31) Word Puzzles [Crossword puzzles, word search]	1							1 90%	10%		
								2			
DELPHI-III COMMENTS: (2) should be visual (spatial relationships between letters, words, boxes, blanks, etc.); Visual is definitely a partial component.											
COMMENTS:											
14.(35) Computer Quizzes/Tests [Similar to pencil/paper tests. Feedback is immediate, results are summarized]	1							1 100%			
								2			
DELPHI-III COMMENTS: Most computer tests are not interactive. The instructional segments may be interactive but the quizzes/tests usually are not. (2) should be haptic (keyboard); By definition, interactive is "talking" not interacting with the computer in the sense of responding to presented activities.											
COMMENTS:											

ACTIVITY	Delphi 1	Amal 2	Intermedia 3	Visual 4	Braille 5	Readwrite 6	Others 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
15. (40) Questionnaire Development [Individual activity, used in market research surveys]((Student must determine information needed from the target market, then hand write, proof, and rewrite or type in final form.))	1							1 100%			
								2			
DELPHI-III COMMENTS: Visual more important than haptic (e.g. could be done by handicapped person with no arms); Still some problem with haptic-- would say visual could be as strong.											
COMMENTS:											
16. (29) Student-Generated Listing [Individual activity, Example: list information usually found on a manufacturer's label]	1							1 100%			
					2			2 50%	10%	30%	10%
DELPHI-III COMMENTS: Haptic really does not fit in here.											
COMMENTS:											
17. (56) Learning Activity Packages (LAPS) Self-Paced Module [Student works from a folder of printed instructions. Instruction includes reading, puzzles, vocabulary words, and practice tests]	1							1 100%			
								2			
DELPHI-III COMMENTS: Not a strong visual but could exist.											
COMMENTS:											

ACTIVITY	Print 1	Audio 2	Intermediate 3	Visual 4	English 5	Readings 6	Comments 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
18. (5) Reading Assignment	1							1 100%			
DELPHI-III COMMENTS:											
COMMENTS:											
19. (46) Brochure Development [Individual activity; write script, layout, format, develop art, proof, print]	1			2				1 100%			
								2 70%	30%		
DELPHI-III COMMENTS: Process seems to be haptic more than visual and then interactive; I also think haptic is used to develop the art; Visual just as dominant here as is print; I concur with last sentence in Delphi-II comments (kinesthetic and haptic are used to develop art).											
COMMENTS:											
20. (22) Guest Speaker	1							1 100%			
								2			
DELPHI-III COMMENTS: Probably lots of visual learning going on (dress, body language, facial, etc.)											
COMMENTS:											
21. (35) Activities/Problem Solving (Orally) [Explanation given before the class] ((Example: the student hears a marketing problem described by the teacher. The student has time to plan, then verbally delivers the solution. Questions from the class would be optional.))	1							1 90%	10%		
			2					2 80%	10%	10%	
DELPHI-III COMMENTS: I agree with Delphi-II comment--the activity does say questions from the class would be optional (acceptance was made on that condition); Reverse the "1" and "2"--student's focus will be on what he/she has to say.											
COMMENTS:											

ACTIVITY	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
22. (19) Lecture [by teacher or guest]	1							1 100%			
DELPHI-III COMMENTS: This is an easy one.											
COMMENTS:											
23. (1) Audiotape	1							1 100%			
DELPHI-III COMMENTS: Easy one.											
COMMENTS:											
24. (15) Recitation by Others [Listening to reports, explanations by other students]	1							1 100%			
DELPHI-III COMMENTS: Easy one.											
COMMENTS:											
25. (13) Use of Records, Compact Discs	1							1 100%			
DELPHI-III COMMENTS: Easy one.											
COMMENTS:											
26. (23) Interview of the Student (Job Interview) [The student is interviewed by an adult for a job, a loan, or on a TV show]		1						1 100%			
DELPHI-III COMMENTS: Hard to separate talking and listening.											
COMMENTS:											

ACTIVITY	Field 1	Area 2	Interests 3	Visual 4	Paths 5	Feedback 6	Observer 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
27. (2) Role Play (Acting assumed roles, spur of the minute, no script) ((Students are seated or standing for roles, impromptu props are optional. Usually in small groups before the class.))			1					1 90%	10%		
								2			
DELPHI-III COMMENTS: Probably some kinesthetic.											
COMMENTS:											
28. (36) Activities/Problem Solving (In Groups) (Discussion in groups, often reported back to the class)			1					1 100%			
		2						2 70%	30%		
DELPHI-III COMMENTS: Aural is #2 if groups report back to class.											
COMMENTS:											
29. (4) Brainstorming (as a Group)			1					1 100%			
		2						2 80%	10%	10%	
DELPHI-III COMMENTS: True brainstorming is interactive.											
COMMENTS:											
30. (21) Oral Presentation (by the student) (Report before the class, may include visuals) ((Student is standing, often behind a lectern.))			1					1 70%		30%	
				2				2 50%	20%	30%	
DELPHI-III COMMENTS: I agree the student doing it is the focus. She/he is not interacting with the class but presenting a report. The report has other students listening? (Panelist felt interactive included more than one person talking); For students listening it's aural; Problem with interactive as classification because presentation is student speaking only. Student is using his/her own style (in brain) during the delivery process; Oral presentation does not say demonstration; interactive by definition is talking!! (referred to student doing presentation is the focus, not listeners).											
COMMENTS:											

ACTIVITY	Del I	And 2	Inter 3	Visual 4	Exhibit 5	Officer 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
31. (42) Communication with a Business (In Person) [Call on business person to gather information for an assignment]		2	1				1 90%	10%		
							2 60%	40%		
DELPHI-III COMMENTS: Same comments as before--separating interactive and aural.										
COMMENTS:										
32. (60) Cooperative Learning Groups [Small groups with individual leadership titles, used for problem solving or for peer instruction]			1				1 100%			
							2			
DELPHI-III COMMENTS: This is a mixed activity--I agree with Delphi-I statement (visuals are used in cooperative learning groups, print is also used); same comments as before--separating interactive and aural.										
COMMENTS:										
33. (47) Display and/or Bulletin Board Construction [Small groups; sketch layout, gather materials, construct]			1	2	2		1 60%	10%	20%	10%
							2 70%/80%	30%/10%	/10%	
DELPHI-III COMMENTS: Why limit this to groups when most others aren't?; Need more specifics? Too vague; Primarily visual and haptic, then interactive; Still don't think this is primarily interactive.										
COMMENTS:										
34. (12) Student Interview of Others [inside or outside the school, used in market research]		2	1				1 100%			
							2 80%	20%		
DELPHI-III COMMENTS: Same as #31 and #32 above.										
COMMENTS:										

ACTIVITY	Del I	Agree 2	Inexpensive 3	Visual 4	Heaps 5	Elaborate 6	Others 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
35. (41) Survey Conduction [Usually in person, contacting individuals, explaining the survey, collecting the survey, tabulating data]			1					1 100%			
		2						2 70%	10%	20%	
DELPHI-III COMMENTS: Could also be haptic--gathering information through touching--but minor. Also print; Same as #31, 32, 33, and 34.											
COMMENTS:											
36. (9) Student-Directed Panel Discussion [Student moderator, student participants]			1					1 100%			
		2						2 80%	10%	10%	
DELPHI-III COMMENTS: I agree with Delphi-II comments (student level of activity is critical); Interaction seems to be dominant--listening sparks the interaction.											
COMMENTS:											
37. (45) TV Spot Production [Group activity; write, choreograph, rehearse, shoot]			1					1 90%	10%		
								2			
DELPHI-III COMMENTS: Mixed activity--all 3 modalities involved as in visual, no clear dominance in activity; Write = print, choreograph = kinesthetic--Probably some visual also.											
COMMENTS:											
38. (59) Debate [One on one or in groups of two or three in front of the class, formal rules followed]			1					1 100%			
		2						2 80%		20%	
DELPHI-III COMMENTS: Similar to previous comment.											
COMMENTS:											

ACTIVITY	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
39. (44) Radio Spot Production [Group activity; write script, rehearse, tape in class or at studio]	2		1					1 100%			
								2 70%	30%		
DELPHI-III COMMENTS: Lots of aural here as they listen, rehearse, etc.											
COMMENTS:											
40. (20) Demonstration by the Teacher [How to dress a mannequin, how to mix primary colors to get secondary colors] ((Assume that a student would hear verbal input from the teacher as part of the demonstration.))	2			1				1 100%			
								2 100%			
DELPHI-III COMMENTS: I think this one is clear cut.											
COMMENTS:											
41. (6) Videotape	2			1				1 100%			
								2 100%			
DELPHI-III COMMENTS:											
COMMENTS:											
42. (26) Teacher Use of Overhead Projector-Pictures, Artwork [Usually as a part of lecture]				1				1 90%	10%		
								2			
DELPHI-III COMMENTS: Ugg seems to be the key word here; NO--Using overheads is different than talking (refers to Delphi-II comment, aural if support for lecture).											
COMMENTS:											

ACTIVITY	Index 1	Acad 2	Microscopy 3	Visual 4	Reading 5	Handwriting 6	Others 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
43. (8) Television Program		2		1				1 100%			
DELPHI-III COMMENTS: Visual is dominant but aural is also a part of the process.											
COMMENTS:											
44. (16) Use of Pictures, Photos [Students pass pictures or view them from a projector.]				1				1 100%			
								2			
DELPHI-III COMMENTS: Easy one.											
COMMENTS:											
45. (14) Use of Graphs, Tables (Charting or Interpretation) [Physical charting of data and written explanation of graph] [[1. Draw graph or chart 2. label parts 3. explain in writing]]	2			1				1 90%		10%	
								2 60%	30%		
DELPHI-III COMMENTS: I agree haptic is a part of this activity, writing of charts probably is not haptic.											
COMMENTS:											
46. (48) Films, Filmstrips (Pictures more than words are on secondary level films.)		2		1				1 90%	10%		
								2 70%	20%	10%	
DELPHI-III COMMENTS: (Just realized what you meant by comment in (()))											
COMMENTS:											

ACTIVITY	Point 1	Area 1	Instruction 3	Visual 4	Length 5	Examples 6	Comments 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
47.(39) College, Poster Development [Individual activity, may use cut and paste or lettering] ((Students often use posterboard, butcher paper, colored markers, rulers, or bulletin board trim))				1				1 90%	10%		
					2			2 70%	10%	20%	
DELPHI-III COMMENTS: I believe haptic should be "1" because development of the poster is primary; Haptic is probably a minor part of this.											
COMMENTS:											
48.(50) Cut/Paste Examples [Individual activity; Use magazines, newspapers to show examples of the topic assigned]				1				1 80%	20%		
					2			2 70%	20%	10%	
DELPHI-III COMMENTS: Reverse the "1" and "2"; Odor has nothing to do w/activity; haptic is quite minor.											
COMMENTS:											
49.(54) Computer Instruction Simulation--Jeans Factory [Individual activity, computer uses graphics and words. The student must decide on labor, materials, payroll in order to produce a profit. Answers are open choice; a worksheet is used to record student decision] ((The student may receive verbal instructions or demonstration from the teacher to start the simulation. Students then work independently to answer questions on the screen, via the keyboard, about profit related factors in this jeans business.)) ([1.Observe pictures or graphs 2.observe words or numbers 3.make decisions, respond by keyboard])	2			1				1 80%	20%		
								2 70%	20%	10%	
DELPHI-III COMMENTS: I would add haptic here; May actually be a reverse of "1" and "2"--description does not suggest clear dominance.											
COMMENTS:											

ACTIVITY	Final 1	April 2	Intermediate 3	Visual 4	Reading 5	Exercises 6	Others 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
50.(53) Computer-Assisted Tutorial (Change Making) [Individual activity, computer show pictures and words, then asks for student multiple choice answer] ((Students may receive verbal instructions or teacher demonstration to begin the simulation. They answer questions on the screen by using the keyboard. The screen displays the correct answer and goes to the next problem. Proportions of pictures to words will vary according to software.))	2			1				1 80%	20%		
								2 90%	10%		
DELPHI-III COMMENTS: If teacher gives verbal instruction then aural modality is also part of this activity; Not clear if dominant mode of presentation is print (on screen) or visual images.											
COMMENTS:											
51.(43) Slides with Audiotape ((Content on the slides would differ according to unit subject and production company. Assume a variety of picture and sound information.))				1				1 90%	10%		
	2							2 80%	10%	10%	
DELPHI-III COMMENTS:											
COMMENTS:											
52.(51) Arrangement of Merchandise or Cash (School Store) [Individual activity; Move merchandise for best selling, can include merchandise display. Arrange money in cash drawer properly] ((Students arrange merchandise attractively such as a spiral rack for T-shirts and for the best sales advantage such as "sale" items near the cash register. Money in the drawer arranged according to universal business policy.)) [1. Physical moving of items 2. visual appraisal]]					1			1 80%	10%	10%	
				2				2 70%	20%	10%	
DELPHI-III COMMENTS: I would reverse. It's the physical relationship of items students are really learning, not how to touch, pick-up, reach, etc.											
COMMENTS:											

ACTIVITY	Exptl 1	Aural 2	Kinesthetic 3	Visual 4	Reading 5	Handwriting 6	Others 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
53. (62) Change Maker Machine [Individual activity, interact with equipment to indicate change to be given] ((Similar to an interactive computer screen; student indicates change to be given for amount of sale and amount tendered. Machine gives feedback as to correct answer.))				1				1 60%	10%	20%	10%
				2				2 70%	30%		
DELPHI-III COMMENTS: Same as previous comment; After looking at the machine--I feel its mostly visual; I assume that presentation on screen is primarily in print form; Visual sounds like it's dominant.											
COMMENTS:											
54. (17) Student Demonstration [Sales demonstration, dressing a mannequin; action with oral explanation]						1		1 90%	10%		
								2			
DELPHI-III COMMENTS: "Z" should be aural and visual; "Z" would be interactive; Explanation makes it interactive also.											
COMMENTS:											
55. (52) Plays, Skits [Used with groups, works from a script]((Verbalization will vary depending on script used.))						1		1 60%	20%		20%
			2					2 90%	10%		
DELPHI-III COMMENTS: I agree that it is difficult to say kinesthetic is the most dominant--print is the first modality used in reading the script--so maybe should read--print "1", kinesthetic "Z"; I would reverse. Dominant element seems to be what student does in relation to what others are doing; Interaction first, then kinesthetic (which may not be used sometimes).											
COMMENTS:											

ACTIVITY	Del 1	Aud 2	Inter 3	Vis 4	Read 5	Read 6	Ob 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
56. (3) Teacher-Directed Group Discussion [Students are called on by the teacher for answers or input]	1	1						1 80%/90%	20%/10%		
	2							2 60%	10%	20%	
DELPHI-III COMMENTS: If the teacher sets it up properly, then interactive, must assume you have a strong teacher; The key word is discussion--the student listens; Don't need aural as "1" and "2".											
COMMENTS:											
57. (57) Field Trip [A group activity where students travel to a site outside the school for observation purposes. An instructor or tour guide gives verbal remarks before or during trip]	1			1				1 80%/90%	10%/10%	10%	
								2			
DELPHI-III COMMENTS: Still lean toward interactive; Probably kinesthetic content as well.											
COMMENTS:											
58. (18) Use of the Telephone [Calling to gather information, taking a message]	1	1						1 100%/90%		/10%	
		2						2 90%	10%		
DELPHI-III COMMENTS: The two way conversation is the key; Taking message is aural/gathering information is interactive; This one is multi-sensory; Heavy interactive component here; I think aural and interactive are both "1", don't need interactive as a "2". But I tend to think aural is "1" and interactive "2" so in that case I would have a "high acceptance for interactive as a "2" if you eliminated interactive as a "1".											
COMMENTS:											

ACTIVITY	Print 1	Aural 2	Memorized 3	Visual 4	Reading 5	Writing 6	Abstract 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
59. (7b) Note Taking [From teacher lecture]	9% 6/8	91%		2/8				XXXXXX	XXXXXX	XXXXXX	XXXXXX
DELPHI-III COMMENTS: To me note taking is a personal way to reinforce recall; Hearing, processing and mentally summarizing is key (aural), a big part is also visually placing notes on the page with *, etc. to help in organizing and recall; Note taking is not visual, nor is it primarily kinesthetic. By definition, note taking is print, print and aural are only two modalities. Comments in () apply. (Panelist is referring to "dominant activity by definition is note taking, others are secondary. The key for the learner is writing--the most important part of the process). Solution is probably "1" and "1" rather than "1" and "2".											
COMMENTS:											
60. (11) Drawing or Palating				30% 6/8	70% 2/8			XXXXXX	XXXXXX	XXXXXX	XXXXXX
DELPHI-III COMMENTS: Primary activity is visual--eliminate haptic and kinesthetic as smaller elements.											
COMMENTS:											
61. (24) Group Project (Poster, Collage, Mural) [Design, draft, construct original ideas] ((Students plan, then prepare by getting supplies usually in classroom, then cut, paste, letter, draw, paint or construct the final product.)) [[1.Group discuss 2.plan/sketch ideas 3.gather supplies 4.construct]]			80%	10%	8/8	10%		XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
DELPHI-III COMMENTS: Print modality if they write plans?; Visualizing the design, layout, shapes, colors, etc. Important; Mixed--no consensus in my mind; No print, interactive is minor modality, also think 3 modalities at work here, emphasis should be on visual and haptic.											
COMMENTS:											

ACTIVITY	Task 1	And 2	Interacts 3	Visual 4	Haptic 5	Resonate 6	Stimulus 7	High Acceptance	Moderate Acceptance	Low Acceptance	No Acceptance
62. (32) Board and Card Games ((Implies a small group, usually seated. Pictures and words may appear on board or cards.)) [[1. Interaction is allowed 2. movement of pieces/cards is expected 3. pictures, words, numbers, and color are used]]	1/8		10% 5/8	90%	2/8			XXXXXXXX XXXXXXXX XXXXXXXX	XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX
DELPHI-III COMMENTS: I think group is the key. Word would indicate print = movement would indicate haptic; Visual is primary, print is very minor, interactive may play some part, haptic may play some part. I can drop everything except visual and simplify this.											
COMMENTS:											
63. (49) Taking of Physical Inventory [[Individual activity or in twos; Often used in school store to count, price, and total merchandise for auditing]] ((Indicates a physical counting of units for each item in the store. The cost is recorded and multiplied by the units using a calculator.)) [[1. Arrange items 2. count and record 3. compute price extensions]]			1/1	20% 7/11	10% 3/11	70%		XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX
DELPHI-III COMMENTS: Interactive modality if not done individually; Not interactive or print as major modalities. "Counting" is the problem--is it haptic, visual or kinesthetic? Definitely a mixed activity--I'm tending to think haptic (touch) is most prevalent in "arranging items," counting is visual, not sure kinesthetic is "arranging items." Decided to go with visual as "1", haptic as "2", but my guess is that this one will still be a problem.											
COMMENTS:											

VITA

Patricia Sue McCurry was born in Blount County, Tennessee, on July 23, 1949. She graduated from Alcoa High School in Alcoa, Tennessee. She then completed a Bachelor of Science in Fashion Merchandising from William Woods College, Fulton, Missouri, and a certificate in Marketing Education from Memphis State University. She received a Master of Science degree in Marketing Education from the University of Tennessee in 1979. She received the Doctor of Philosophy degree in Human Ecology in May 1995.

She was named Outstanding Woman Educator of Blount County, Tennessee, by Delta Kappa Gamma Society International in 1994. She was named Educator of the Year for Maryville, Alcoa, and Blount County School Systems for 1990-91 and was named Teacher of the Year for her school in 1987-88. She was named to the Blount County Chamber of Commerce Education Issues Board and to the Leadership Education Class 1993-94 for the Knoxville Chamber of Commerce. She has also been named in Who's Who in American Colleges and Universities.

She is a member of American Society of Training and Development, National Education Association, Marketing Education Association, American Vocational Association, and Association for Supervision and Curriculum Development. She is associated with the Brain-Based Learning Styles Network. She is a member of Delta Pi Epsilon and Omicron Tau Theta.

She has taught Marketing at the secondary level in the public school system of Blount County, Tennessee, for 17 years. In addition, she has been adjunct

faculty in the Marketing Department at Pellissippi State Technical Community College, Knoxville, Tennessee, and Family and Consumer Studies instructor and curriculum developer at Shelby State Community College in Memphis, Tennessee.

She has been instrumental in a variety of marketing development efforts, serving as Marketing and Training Director for Racon Data Systems, Incorporated in Blount County, Tennessee, and conducting marketing research for LanoCare Laboratories in Knoxville, Tennessee. She is an Image and Wardrobe Consultant for Colorisma, Inc. In addition, she served as Corporate Buyer for Goldsmith's Department Store in Memphis, Tennessee.

She has developed and authored several marketing curricula, including Salesmanship for the Tennessee Marketing and Distributive Education Core Curriculum which is used state-wide in Tennessee, and Marketing for the Tennessee Curriculum Guide for Marketing Education. She also has developed curriculum workbooks for Fashion Merchandising. As part of the Curriculum Consortium at the University of Tennessee, she developed a self-training manual for entry level retail personnel, which is currently in use at several area retail businesses.

Current research interests included perceptual learning styles in high school students and adults, the Delphi research method, brain-based and accelerated learning, instructional methodology and appearance psychology.