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A STUDY TO IDENTIFY MAJOR FIELD TECHNIQUES AND UTILIZATION LEVELS BY CANADIAN INSTRUCTIONAL DEVELOPERS

By

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ABSTRACT

A STUDY TO IDENTIFY MAJOR FIELD TECHNIQUES AND UTILIZATION LEVELS BY CANADIAN INSTRUCTIONAL DEVELOPERS

by

Thomas Lawrence Bennett

The study attempts to identify which field techniques are currently being used by Canadian instructional developers and to what extent they are being employed. It commences with a statement of the problem at hand and provides a discussion on the need for and originality of the work.

In the second chapter, the researcher illustrates the relevance of techniques to the field of Instructional Development by presenting an historical perspective of how educational change may be brought about by technology. Instructional Development is discussed as one means toward a technological, systematic approach to change, and the value of field techniques to the operationalizing of ID systems models is also recognized. Further, the usage of techniques from other disciplines, or the hybrid principle, is also discussed, while the chapter concludes with a citing of Gentry's 1980-81 study and how it serves as a prototype for the present work.

The third chapter presents the ten questions addressed by the study along with a discussion of the research population, the survey sample, the sampling

procedures, the composition of the survey instrument, and an investigation of the data collection procedures. The chapter culminates in a presentation of the analysis and interpretation procedures of the raw data.

The fourth chapter offers an analysis of the data for each of the ten questions, and provides supporting tables.

In the fifth chapter, the researcher presents a summary of the findings and a set of conclusions drawn from the findings concerning the state-of-the-art of Instructional Development in Canada. From these conclusions, the study provides seven (7) recommendations for future research and study in the field of ID, with special emphasis on the Canadian educational arena. Supported by the findings of the study, as well as a number of relevant caveats within the literature, the work concludes with a presentation of five (5) implications for the future of Instructional Development in Canada.

DEDICATION

To my wife Trish

and to my children Drew and Kate

without whose love, trust, and continuing support .....

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The English poet John Donne wrote, No man is an Iland, intire of it selfe. The same may be expressed concerning research: no undertaking, no matter how ambitious or modest, is completed in isolation. The following were immeasurably supportive of this present work and the researcher wishes to acknowledge them at this time:

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CHAPTER 1

INTRODUCTION

Chapter 1 states the problem, as well as an explanation of the need for and originality of the study. These are followed by a listing of basic assumptions and limitations of the study, and a set of definitions for major terms used in the work. Also included is a summary and a brief outline of the organization of the remaining chapters.

STATEMENT OF THE PROBLEM

Instructional development curricula in Canadian institutions have not been systematically designed, and are inconsistent in the ID techniques that they teach students. This research is designed to partly solve this problem by determining, from the field, what techniques (recognized by national, field experts) are known and/or used by instructional developers. Based on these findings, recommendations can be made for the revision of ID programs, and the inclusion of relevant field techniques as suitable tactics for curricula implementation.

The research attempted to identify which techniques are currently employed in the field, and to what extent they were being used by Canadian instructional developers in the period 1980 to 1982. The survey population was made up of members of the Association of Media and Technology in Education in Canada (AMTEC), and although the actual make-up of this organization will be dealt with in greater detail in Chapter III, it is noteworthy that the organization is the Canadian equivalent of the Association for Educational Communications and Technology (AECT), and supported an enrollment of 558 members, when the survey was conducted.

Specifically, a major question of this study asked "how many of a selected set of recognized, valuable techniques were being taught in Canadian training programs for educational technologists or instructional developers?" Although a number of the techniques in the set selected for this study (Appendix A) are rooted in education in general and Instructional Development in particular, a significant number have been developed in other fields, such as Psychology, Communications, and business and industry. The question arises, "how many of these diverse techniques are being employed by developers in the present Canadian educational arena?" A second question asks "which techniques are considered to be of outstanding value by these developers?"

The responses to the above two questions should assist graduate instructional technology programs in determining which techniques are of greatest perceived importance in the field of Instructional Development in Canada, and concomitantly, which techniques should be taught at the graduate and the under-graduate level to preservice and inservice teachers.

NEED FOR THE STUDY

A major concern of the work was its uniquiness and relevance to the Canadian, Educational scene. How original was the topic of study? How useful was it to Canadian, instructional technologists? In order to answer these questions, a search of the Educational Resources Information Center (ERIC) and Dissertation Abstracts was performed. ERIC descriptors were also correlated with State-of-the-Art Reviews and several field techniques that would be used in the study (ex., Content Analysis, Critical Path Method, Force Field Analysis, Formative Evaluation, Summative Evaluation, Management by Objectives, and Critical Incidents, etc.). Of the eighteen entries resulting from the search none dealt specifically with the questions of this study. Only two citations surfaced as a result of dropping Teacher Education and Curriculum Education descriptors from the search: "The Documentation of Instructional Development" (Educational Technology, June 1975, pp. 43-46), and "A Critical Review of the Instructional Technology Mechanism of Task Analysis" (Improving Human Performance, Summer 1974, pp. 64-70). Neither article relates directly to the need for the present study, although they are relevant to a survey of the literature.

A second ERIC run with the addition of the descriptor "Canada" caused the number of citations to drop to zero. None of the abstracts addressed themselves to the specific needs of the present research work.

An informal telephone survey of five (5) Canadian leaders in the field of Instructional Development was conducted in order to acquire authoritative opinion about the need for this study. The developers (see Appendix B) reacted most positively and gave assurances that such research is unique to the Canadian scene, as far as they were aware, and would benefit Canadian instructional developers. Further, these leaders agreed to serve as expert validators of the initial survey of techniques (Appendix A) and to provide additional names of other key developers in Canada who might subsequently act as field experts for the validation of the survey instruments.

Therefore, after the above noted conferencing with Canadian field experts, and the dissertation abstracts search, it was concluded that little is known about the levels of knowledge and application of instructional development techniques among Canadian instructional technologists. Hence, this study is needed in order to provide educational planners and decision makers who are involved in training instructional technologists with hard data for determining which techniques are appropriate for inclusion in their academic curricula.

Based on this need, the study is designed to provide conclusions and recommendations in response to the following questions:

1. Which of the major techniques are currently taught in graduate schools and teacher training institutions?
2. Which of the major techniques should be taught to Canadian developers of instructional programs?
3. Which of the major techniques should be taught to students in teacher training institutions, according to the perceived value or relevancy of each technique, as viewed by the developers?

Another important consideration of the research was to match the major techniques, as determined by the study, with appropriate functions of an Instructional Development model. Gentry (1980) contends that instructional development system models are descriptive, while techniques used by instructional developers are prescriptive: "...... it is appropriate for ID system models to tell us what must be done". He further asserts that "many useful techniques have been designed to operationalize ID system models, but the techniques are scattered and difficult to find or assess".

Hence, as a secondary goal, this study attempts to determine the validity of Gentry's contentions by determining the range of techniques known, or deemed valuable to ID by the survey population.

BASIC ASSUMPTIONS

Underlying the study were the following basic assumptions:

1. The instrument will yield the data that the researcher is seeking.
2. All respondents will respond accurately.
3. The researcher will be able to match the major techniques as determined by this study with appropriate functions of an Instructional Development model viz. Gentry's Management Framework Model (see Appendix C).
4. This study may inspire further research relating to instructional techniques employed in graduate studies and teacher training institutions, in Canada.

LIMITATIONS OF THE STUDY

There are three specific limitations of this study:

1. The data accepted for analysis is limited to the responses of the surveyed population.
2. The study is limited to only those major techmiques agreed upon by the panel of field experts. (see Appendix D)
3. The results of the study are generalizable only to Instructional Developers in Canada.

DEFINITION OF TERMS

Educational Technology is "a complex, integrated process involving people, procedures, ideas, devices and organizations, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning. In educational technology, the solutions to problems take the form of all the Learning Resources that are designed and/or selected and/or utilized to bring about learning; they are identified as Messages, People, Materials, Devices, Techniques, and Settings." (A.E.C.T., 1977:164-5)

Instructional Development is a systematic approach to the Design, Production, Evaluation, and Utilization of complete systems of instruction, including all appropriate components and a Management Pattern for using them. Instructional Development functions are those which have as their purpose: "analyzing problems and devising, implementing, and evaluating the Learning Resources/ Instructional System Component solutions to these problems." (A.E.C.T., 1977:166)

Instructional Developer is a professional practitioner in the field of Instructional Development. In the present study, the term instructional developer is used interchangeably with the membership of the Association for Media and Technology in Education in Canada, who are the members of the survey population. However, it must be noted that not all respondents are trained instructional developers, although they may be involved in some phase of the I.D. process; some are administrators, librarians, technicians, etc. Hence the researcher employed "Instructional Developer" as a generic term for the survey population, fully realizing that the actual identification of such would not be possible until the analysis of the data in Chapter IV.

Technique is a routine procedure or pre-cast mold for using Materials, Devices, Settings, and People to transmit Messages (A.E.C.T., 1977:169). It is specific, with well defined characteristics and processes which are learnable and hence transferable. It is appropriate at the Strategical or Policy Decision Level of the Instructional Development process, as well as at the Tactical or Operation Level. Finally, it must not exceed the constraints of the system in which it is operational: (a) time available, (b) skills available, (c) resources available, (d) client attitudes, and (e) physical limitations.

SUMMARY AND ORGANIZATION OF THE STUDY

This chapter has provided an outline of the problem under consideration as well as a declaration of the need and originality of the basic assumptions and limitations of the work, and concluded with a set of definitions of the major terms used in the study.

With regard to subsequent chapters, a review of the literature pertinent to the study is presented in Chapter II, while Chapter III outlines the specific

procedures involved in conducting the study. Chapter IV presents the findings of the study and the actual analysis of the data, and Chapter V concludes the presentation with the summary of major findings, conclusions, recommendations and implications for future research.

CHAPTER II

REVIEW OF LITERATURE AND RELATED RESEARCH

It has been observed that the main end of education in any single period of history is that end which best reflects the needs of society at the time (Cole, 1960:618). Perhaps the dominant feature of global society today, as well as our own North American culture, is that of planned change. Zaltman and Duncan (1977:4) have focused on this issue in the field of communications, while major proponents of Educational Technology including James Finn (1964:89), have pointed up the effects of technology on educational processes for at least two decades.

It is becoming increasingly evident that education is being effected by the unstable social and economic climates of society coupled with financial restraints persistantly troubling the field of Instructional Development (Selby, 1980:13). These conditions logically make important the use of techniques which are not only effective, but efficient in terms of time and resources. Thus, the present study is concerned with techniques that are being used in the market place which are viewed by the survey population as being effective and efficient for Instructional Developers to use in order to bring about the desired changes in learning systems of society.

In this chapter, several areas of the literature will be investigated. The change literature will be examined as it relates to our field and educational organizations' traditional resistance to it. A second area of the literature to be reported on is technology in education and audiovisual education including educational systems and instructional development. The latter will focus on tactics and strategies as they relate to field techniques.

CHANGE

The negative aspects of change are exemplified by John Steinbeck:

> Don't look behind. Something might be gaining on you. (Steinbeck, 1961:164)

Change in our society is often characterized by two considerations. First, people only too often use the past as measuring sticks for the present and future; second, change is occuring so rapidly that traditional means for dealing with it are no longer adequate. As an example of the former, McLuhan observed that we are often guilty of trying to do today's job with the aid of yesterday's tools and concepts. This key theme is repeated throughout his work The Medium is the Message. He warns:

> Our most impressive words and thoughts betray us - they refer us only to the past, not to the present. (McLuhan, 1967:63)

Once again, this theme is evident as he asserts the following:

> We look at the present through a rear-view mirror. We march backward into the future. (McLuhan, 1967:75)

Although a colourful quote, McLuhan was not the first to express this sentiment with the "backward marching" metaphore. Muller espoused the identical philosophy fifteen years previously:

> . . . we have the curious spectacle of civilized man forever marching with his face turned backward - as no doubt the cave-man looked back to the good old days when men were free to roam instead of being stuck in a damn hole in the ground. (Muller, 1952:65)

In the second consideration of the Steinbeck quote, change may be viewed as occuring rapidly. In many instances, it may be upon society before realization occurs. It is in this regard that Ellul (1963:19) warns of becoming enamoured of signposts mired in the past, and asserts that in the modern world, nostalgia has no survival value. Berlo (1975:3) concurs and states that old ground rules are obsolete in so many of the processes of our society. There can be little doubt that change in our society is occuring so rapidly that referents of the past are often useless. In a time of rapid change, the world will belong to "those who can grasp the nature of that change and fashion their life and culture to make the most of it." (Finn, 1964:5).

The educational arena is no exception. Change there too has been rapid and pedagogues are faced with the dilemma of training students in the last quarter of the twentieth century with congruent tools and methodologies. Wittich and Schuller (1973:5-6) observed that great social as well as technological changes confront and effect teachers and their relationships with learners, and pointed out that as a result teachers are faced with three primary needs: 1) the need to keep up to date with current information and field practices, 2) the need to deal with individual student differences, and 3) the need to acquire and practice the best available teaching techniques. In short, their contention is that teachers must prepare themselves to operate in their market place with tools best suited to this present era in education.

However, educational literature illustrates that it is not always easy to induce educators in general and even instructional developers in particular to adopt new tools or techniques. The rate of change in the educational arena is often affected by numerous barriers to change. Zaltman and Duncan (1977:66-88) provide an overview of literature on change barriers, concluding that there are three basic ones: cultural/social, psychological, and organizational barriers. Further investigations support the above noted findings as in the work of Foster (1962:75-76), who asserts that one of the major barriers to change stems from cultural values and beliefs; this is further supported by Lippitt, et.al. (1958:181) and Frye (1969:1-12).

The rate of change is further affected by psychological barriers. Caffrey (1965:14) notes that most people are "heel-dragging resistors to change, suspicious of the new, and not very much interested in creating new things". Watson and Glaser (1965:36) point out that innovations that are introduced to a system from an outside source are often received with half-hearted support, if not overt opposition. As such, psychological barriers go much "deeper" than resistance to change, which as Judson (1966:69) observes is only a symptom of more basic problems; often the underlying causes are found within the system itself. Hence, an awareness of organizational barriers is also necessary for any agent who is concerned with accelerating the rate of change. Zaltman and Duncan suggest that one of the most important sources of resistance is that change may be perceived as threatening to the power structure of the organization, and argue that for change and innovation to succeed in an organization,

> . . . it is important that the structure of the organization in terms of authority patterns, channels of communications, divisions of labor, rules and procedures, etc., be compatible or supportive of the change.
> (Zaltman & Duncan, 1977:76)

The above opinion is further supported by Judson (1966:80), Woods (1967:57), and Broom & Selznick (1968:344) to name a few. Thus, the rate of change is significantly affected by cultural, psychological, and organizational barriers and educational growth can be effected only if relevant and innovative techniques are permitted to be implemented. In the words of novelist John Irving:

> . . . you only grow by coming to the end of something and by beginning something else. (Irving, 1978:159)

The acceptance of an innovation is a major concern of any creator, whether he be scientist or messiah, inventor or teacher. It is within the nature of man to change his environment: "Man's re-ordering of the face of the globe will cease only when man himself ceases" (Weinberg, 1975:2). Yet, as intimated above, the innovator is not always popular. Guskin (1969:10) notes that he is ".... an annoying minority, a gadfly, an irritant who nevertheless likes to think he will stimulate a pearl within the establishment's hard shell." Hence, careful consideration must be given to methods of <u>how</u> an innovation is diffused:

> The lack of a diffusion system will lead to abortive change.
> (Orlosky & Smith, 1972:414)

Orlosky and Smith argue that change will not become widespread or permanently entrenched without a plan for diffusion, while Havelock (1973:119) advises that the diffusion of an innovation begins with the acceptance of the idea by a few key members of the system. Statistically, Rogers and Shoemaker speak in terms of the <u>diffusion effect</u> and relate it directly to thresholds:

> . . . as the rate of awareness - knowledge of the innovation increases up to 20 - 30%, there was almost no adoption. Then once this threshold was passed, each additional percentage of awareness - knowledge in the system was associated with several percentage increases in the rate of adoption.
> (Rogers & Shoemaker, 1971:163)

As a testimony to the significance of the diffusion process, many citations may be found within the literature, including Beal (1962), Czepiel (1972), Eicholz (1963), Grinstaff (1969), Gross (1971), Havelock (1971), Lin and Burt (1975), Rogers (1962), Smith (1968), Turnball, et.al. (1974), Zaltman (1971), and Zaltman and Stiff (1973).

Much of the research provides the instructional developer with numerous techniques relevant to the change processes; there are many collections of techniques which may be used in order to bring about planned change. Of note are Havelock's The Change Agent's Guide to Innovation in Education, Roger's Diffusion of Innovations, Bennis, et.al.'s The Planning of Change, and Roger & Svenning's Managing Change. Other citations include Beckhard (1969), Bennis, et.al. (1965), Havelock (1973), Johnson (1969), Rothman (1974), Mehrabian (1970), and Zaltman and Duncan (1977), to name a few.

In order to be effective in the educational arena, instructional developers must avail themselves of diffusion techniques, not only to implement new programs, but to develop a more favourable, basic attitude of the clients toward new ideas in particular and change in general (Rogers, 1976:281). Hence, it is important that change research is collected and incorporated into the curricula of Instructional Development programs. In such a manner, future developers and change agents may be properly equipped to effectively and efficiently diffuse educational innovations as well as accelerate the rate of educational change. In this manner, teachers may very well prepare themselves to operate in their market place with tools such as the above noted techniques found within change literature. Further, it is no accident that many of these tools come from Educational Technology. It is the opinion of Brown, Norberg, and Srygley (1972:1-2), that technology can make education more productive and individual, instruction more scientific and powerful, learning more immediate, and access to education more equal.

EDUCATIONAL TECHNOLOGY

This section addresses the relevant literature on Educational Technology, specifically in terms of its subset Instructional Development and the relationship of techniques to both.

Since the dawn of recorded history, mankind has sought to live in closer harmony and with greater ease within his environment. He has explored nature, attempted to conquer it and finally to understand it (Mumford, 1962:31). In so doing, he has sought the use of tools, technologies that have eased his burden and enabled him to exist harmoniously with his surroundings (Ibid, 321). As a result, Mumford contends that by the sixteenth and seventeenth centuries, the new religious Messiah was the machine (Ibid, 45). This belief is shared by John Wilkinson in his introduction to Ellul's The Technological Society:

> Since the religious object is that which is uncritically worshipped, technology tends more and more to become the new god.
> (Ellul, 1967:xi)

Further, it may be asserted that the world is technological in nature, and as Finn (1962:70) pointed out, men are seeking to solve some of their problems by technological means; however, Finn is quick to point out that technology is not merely a collection of gadgets and hardware. In agreement with this philosophical stand is Saettler (1968:5-6) who suggests that the word technology "does not necessarily imply the use of machines....but refers to any practical art using scientific knowledge."

If technology, which comes from the Latin texere meaning to weave and construct, is not just men and machines, what then is it, and how does it apply to our present investigation of change in education? Dealing with the first half of the above question, technology is a process and a way of thinking (Finn, 1960:142). It is a complex, integrated organization of men and machines, of ideas, of procedures, and of management (Hoban, 1965:194). Technology is a complex, integrated process for analyzing problems, and of devising, implementing, managing and controlling and evaluating solutions to those problems (Association for Educational Communications and Technology, 1977:169). Galbraith (1967:12) points out that the main characteristic of technology is the breaking down of tasks into detailed subdivisions so that organized knowledge may be put to work, and Finn (1965a:193) wrote that technology is a force which encompasses invention, techniques, machinery, men, money, and methods.

It has already been asserted that societal change necessitated the creation of new methodologies. Often, the old solutions to new problems are not feasible because we are not equipped with sufficient technologies (Hussain, 1973:208). However, as technology continues to develop, new forms of organizations are necessary (Broom and Selznick, 1968:78). Such is evident in the educational arena. In order to solve existing educational problems and keep abreast of the rapidly changing times, Educational Technology evolved and developed; practitioners of the pedagogical arts adopted procedures and philosophies of the general market place and developed the process of Educational Technology. Definitionally, it is very similar to and incorporates many of the above definitions of Technology. According to the Task Force on Definition and Terminology of the Association for Educational Communications and Technology, Educational Technology is:

> A complex, integrated process involving people, procedures, ideas, devices and organization, for analyzing problems, and devising, implementing, evaluating and managing solutions to those problems, involved in all aspects of human learning. In Educational Technology, the solutions to problems take the form of all the <u>Learning Resources</u> that are designed and/or selected and/or utilized to bring about learning; they are identified as Messages, People, Materials, Devices, Techniques, and Settings.
> (A.E.C.T., 1977:164-5)

In a critical examination of the subject, Hlynka (1981) discusses a dual view of Educational Technology. He suggests that a Physical Science approach sees educational technology as being primarily concerned with audiovisual hardware and software, while a Behavioral Science view concerns itself with the "practical application to education of the laws, rules and heuristics of educational psychology and educational communication, and general systems theory to education" (Hlynka, 1981:3). It is this duality of definition which leads us to the next portion of this chapter's considerations. The historical roots of the field of Instructional Development are grounded in these two views of Educational Technology. In the former case, one can witness the significant contribution of audiovisual aids to education. Such a view is typified in Arnheim's enthusiastic statement about one set of techniques:

> . . . the contribution of photography in all its forms has revolutionized teaching and learning in most areas of study.
> (Arnheim, 10(5):18)

By the late 1940s and early 1950s, an increasing emphasis was being placed upon newer and expanded media in education (Brown, Norberg, & Srygley, 1972:343-4). These media were fast becoming recognized as important aids to good instruction, rather than as a prop for poor teaching (Davies, 1981:192). Even earlier, Finn (1964b:96) declared that "the educational future will belong to those who can grasp the significance of instructional technology", and Scuorzo (1967:vii) went so far as to suggest that every school in the United States should have an audiovisual coordinator to help teachers develop the AV presentations needed for optimum instruction. Further, Moller claimed that

> . . . we are only beginning to discover how much all these media, each in its own way and often in concert, can contribute to achieving the major aims of modern education. (Moller, 1970:11)

With the widespread use of such media, it was only a matter of time before they had an important effect on education. Glaser (1965:804) noted the modification of instructional procedures and significant changes in materials and techniques used by teachers, while Hussain (1973: 2-3) identified the increasing demand for services provided by information systems which included numerous management techniques. Hence, educational technology was adopting, as well as adapting techniques from the out-of-school society (Wittich & Schuller, 1973:xix), and field theorists were predicting the "development of team techniques involving the cooperative efforts of different types of expert communicators who are familiar with and able to apply learning theory and know how to use information gathering, manipulation, and interpretation techniques" (Brown, Norberg, & Srygley, 1972:11-2). As a result, the management of information systems was recognized as one of the central competencies needed in modern education (Berlo, 1975:10).

In order to achieve maximum results with the utilization of audiovisual hardware/software, there had to be a modus, a means of incorporating the physical devices within a scientifically valid delivery system that was employed to analyze, develop and evaluate practical solutions to teaching and learning problems. Wittich and Schuller (1973:631) noted that there was a definite need for a new kind and level of planning to help assure that the efforts of educational technologists would be successful and effective; they concluded that Instructional Development is predicated on such a systematic approach.

INSTRUCTIONAL DEVELOPMENT

Any study of Instructional Development must include the concept of systems and system approaches. A systems approach is a systematic attempt to achieve specific objectives or accomplish particular goals through the identification, development and evaluation of a set of materials and strategies (Erickson & Curl, 1972:66; Twelker, Urbach & Buck, 1972:1). As noted earlier, Instructional Development may be viewed as an area that applies systems approaches to solving instructional problems. Definitionally, it has different meanings for different individuals. In his work The Intricacies of Instructional Development, Duncan (1978:22) used the term instrucional development interchangeably with systems approach, instructional technology, and educational technology; however, this was only done in order to alleviate semantical confusion in his study.

Instructional Development has been defined in terms ranging from the simple to the complex. In the former instance, Buhl (1975:2) has termed it "a set of activities aimed at improving the condition of learning for students". Gustafson's (1971:1) terse definition identifies Instructional Development as a process for improving the quality of instruction, and Low (1981:17) points out that its purpose is the synthesis of useful educational products. Instructional Development seeks to <u>design</u> instruction, rather than supplement it (Faris, 1968:971-3).

More specifically, Abedor & Sachs (1978:4) proposed a definition which focused on the design, development, implementation and evaluation of instructional materials, lessons, courses, or curricula while attempting to improve teaching and learning. However, two facets of Instructional Development that are not explicit in the above definitions are those of problem identification and use of feedback loops, as expressed by Schauer's definition:

> . . . common-sense planning of cooperation to identify and define learning problems and to attempt resolutions of those problems with a plan for action, evaluation, tryout, feedback and results. (Schauer, 1971:44)

Finally, the definition offered by the Association for Educational Communications and Technology encompasses the above, but further points out that

> . . . instructional development is larger than instructional product development, which is concerned with only isolated products, and is larger than instructional design, which is only one phase of instructional development. (A.E.C.T., 1977:172)

In an era when educational change is so rapid, the value of a systematic approach to Instructional Development may be seen as valuable to educators who are encouraged to understand all the component parts (and their interactive factors) of a problem; the adoption of such an approach has gained significant currency in North America and the rest of the world (Bass & Hand, 1978:99). This spreading awareness of I.D. in the educational community is demonstrated by increasing references to its benefits in popular and prestigeous magazines (Heinich, 1970:15). A common method for illustrating the process of Instructional Development, is by means of a model. A number of such models exist which illustrate the relationships between and among the various components of the I.D. process. Examples are found within the works of DeCecco (1968), Hamreus (1970), the Instructional Development Institute (1971), Gerlach & Ely (1971), Gustafson (1971a), Gentry (1980-81), Stamas (1972), and Gentry & Trimby (1983), to name a few. For a relatively recent investigation of existing I.D. models, one may consult A Comparative Analysis of Models of Instructional Design by Andrews & Goodson (1980:2-16).

Thus, following the processes illustrated by these models, it is assumed that the instructional developer may work more effectively and efficiently to bring about instructional change. Not only will application of systematic processes assist the instructional developer in the design of instruction, but these processes assist him or her in their role of catalyst to bring about change (Diamond, 1974:6-8). In agreement is Briley (1971:39-42) who states that Instructional Development agencies are

> . . . catalysts for the improvement of instruction providing specialists in the techniques and resources needed to improve instruction. (Briley, 1971:39-42)

Generally the literature presents Instructional Development as a potent force for the execution of educational change, where practitioners are skilled in the use of relevant resources and I.D. techniques. It is the consideration of these instructional development techniques which is the major focus of this study.

The literature reports a wide range of techniques that may be used to accomplish the various functions of an I.D. process. An assumption of this study is that to be effective and efficient, the instructional developer must be aware of the existence, and skilled in the use of certain relevant techniques. As previously stated, this study is concerned with the knowledge about the utilization levels of field techniques as employed by Canadian developers.

RELATION OF TECHNIQUE TO INSTRUCTIONAL DEVELOPMENT

In order to achieve planned, educational change, the instructional developer must be equipped with a number of specific tactics that s/he can bring to bear upon the problem. Not to be confused with strategies (which simply consist of an over-all design likely to accomplish broad objectives), tactics are much more detailed. According to Davies (1981:124-6) strategies are concerned with the why and what of instruction whereas tactics are concerned with the how of instruction. As a subset of strategy, tactics are the cutting edge of strategy; they are the activities that involve everything from how to write objectives to the behavior of instructors and learners, to the use of audio-visual aids. The activities element of tactics leads to the study of field techniques. In considering tactics, the focus is on techniques of classroom teaching and/or mediated teaching, employed to bring about the desired strategic objectives of instruction (Heinich, 1970:141).

What, then, is technique and how might a seemingly random set of techniques be culled from a myriad of disciplines and beneficially applied in the field of Instructional Development? The French Sociologist Jacques Ellul in his classic work The Technological Society asserts that technique has become almost completely independent of the machine (1967:4). Rather, technique is the means and the ensemble of means to attain a predetermined end (1967:19), an application of the formulas of a practical product to practical life (1967:7), and thus through the use of technique,

> . . . man is able to utilize to his profit powers that are alien or hostile. He is able to manipulate his surroundings so that they are no longer merely his surroundings but become a factor of equilibrium and of profit to him.
> (Ellul, 1967:25)

In the foreward to Ellul's work, Merton provides a more precise definition by stating:

> Technique refers to any complex of standardized means for attaining a predetermined result. (Merton, 1967:vi)

Relevant to this study, the Association for Educational Communications and Technology defines technique as

> . . . a Learning Resource/Instructional System Component. Routine procedures or pre-cast molds for using Materials, Devices, Settings and People to transmit Messages. (A.E.C.T., 1977:169)

In addition to the definition that was presented on page 8, techniques may be defined as <u>those tactics employed by instructional developers that accomplish the requirements of any component or function within an I.D. systems model</u>.

Techniques will be examined in terms of their active ability to <u>accomplish</u> the objectives of educational change. To paraphrase Oscar Wilde (1964:62), "Good techniques exist simply in what they make, and consequently are perfectly uninteresting in what they are". Hence, this study is concerned with those techniques which can best effect educational change as they relate to the field of Instructional Development. Later in this chapter, will be discussed how some of them relate to various functions of an I.D. model, but for the moment it is necessary to investigate the source of these techniques. Many reports of techniques are found within educational literature, however, it is extremely important to note that they are often difficult to discover. Gentry aptly supports this point:

> . . . many useful techniques have been designed to operationalize I.D. system models, but the techniques are scattered and difficult to find or assess.
> (Gentry, 1980-81:33)

A significant number of these techniques are not even found within the literature of Instructional Development, but rather are rooted within other disciplines such as Psychology, Communications, Economics, Business Management, Medicine, and others. Until recently, these other fields had to be researched in order to cull out relevant techniques that might be applied to our discipline. This adoption/adaption process is not new to education in general (Broom & Selznick, 1968:344) nor to the antecedent field of audiovisual education in particular (Finn, 1953:175; Finn, 1965:66; Wittich & Schuller, 1973:631). McLuhan suggested that the methodology of our era is to use multiple models for exploration (1967:69), and it is to him that we credit a label for this process.

While discussing operation research programs, McLuhan (1964:62-3) compares them to the cultural mix occuring during wars and migrations. He calls this adoption of techniques from many areas the <u>hybrid principle</u>, in itself a technique of creative discovery. This hybrid principle would appear to be functioning with instructional development. In order to affect educational change, instructional developers have often adopted and/or adapted tactics from many other disciplines. In tracing the source of common

I.D. techniques, it is in such a manner that our own lexicon of field techniques has expanded. The hybrid principle is seen as important for the development and continuance of our field by our scientists as well as those in interfacing disciplines (Hussain, 1973:2-3; Hanneman, 1975:317; Zaltman & Duncan, 1977:91; Langdon, 1981:26).

If the above conclusions are true then instructional developers should be practising the hybrid principle, by using tactics of other disciplines when applicable, and assembling collections of such techniques which will be more accessible to subsequent developers when they are attempting to affect educational change in the future. Such collection procedures have already begun as we will note later in this chapter. This present dissertation is only one attempt to bridge the gap between what presently exists and what needs be accomplished.

EXISTING TECHNIQUES

As was noted in Chapter I of this study, the results of the ERIC and Dissertation Abstract search coupled with a subsequent search at the Ontario Institute for Studies in Education (OISE) at the University of Toronto revealed few documented works dealing with collections of field techniques. This provided evidence that the study under consideration was unique and original, yet it supplied little information concerning collections of field techniques relevant to our discipline. However, numerous entries concerned with individual techniques were gleened from the pages of professional journals. One landmark study was provided by J. Christopher Jones in his book entitled Design Methods, seeds of human futures (1970).

Generally, Jones' work is divided into two major sections: Part 1 acts as a review of past and present design methods that have been utilized in assisting planners and designers to find methods that can be applied to particular design situations, including traditional methods of design-by-drawing, design as an art or form of mathematics, and the consideration of surmounting interpersonal obstacles to solve modern design problems. Part 1 also includes a review of such relatively new methods as Black Box and Glass Box theory, as well as the concept of designers as self-organizing systems. Part 2 is more relevant to the present study. Here, an outline is provided with examples, of thirty-five methods of design that fall within the scope of this study; herein is found an investigation of numerous techniques ranging from Literature Search to Questionnaire, from Brainstorming to Morphological Charts, from Analysis of Interconnected Decision Areas (AIDA) to Checklists. Each technique citation dealt with an outline, aim, example(s), application, and comments on cost and time requirements. Almost as important, each technique description included a set of references, which allowed investigation of Primary and Secondary source materials.

Another valuable work found to be relevant to the present study was that of Delp, Thesen, et.al. (1977). Entitled Systems Tools for Project Planning, the book is designed to present a number of techniques which may be used by a practitioner to address problems of design such as generating ideas, objectives, and methods of evaluation. It is a toolbook which can be used either as a text or as a reference, and it is designed so that it may be used by developers in many different fields. Many of the examples are drawn from agriculture, health, family planning, and employment, as well as from the field of education. It is the belief of the authors that planning tools, such as the techniques found within the text, have universal utility. Each technique describes what the developer needs to know in order to select a tool, utilize the tool, and finally understand its implication and underlying theory. Each technique begins with a brief statement of the purpose and uses of the tool, supplemented by a list of key definitions relevant to the technique. Next is a presentation of the advantages and limitations of the technique, which is followed by a study of required resources, tool descriptions and method of use. The technique presentation concludes with a description of examples, a statement of fundamental background theory and a bibliography.

A recent publication dealing with a variety of field techniques is Ivor K. Davies' Instructional Technique, published in 1981. As the title implies, it is a text about instruction wherein the emphasis is on the techniques of teaching. It is divided into three major sections, the first one dealing with the strategies of instruction, which includes such chapter titles as Efficiency and Effectiveness, Instructional Methods, Structure of a Lesson, and Lesson Planning. The second section deals with the tactics of instruction and contains such chapter titles as Question Technique, Assessment Techniques, Audiovisual Aids, and Needs, Objectives, and Commitment. The final section is entitled Instructional Concerns, and it deals with such topics as the personality of the instructor, individual differences, and discussion techniques. A number of important field techniques are presented in Instructional Technique, but a major strength of the work is its relevancy to this present study in that it is a definitional organizer for strategies and tactics, as well as the duel topics of efficiency and effectiveness.

In addition to the three above mentioned volumes, a total of forty (40) professional journals were found that provided papers relevant to individual instructional development techniques. As was noted earlier in this chapter, a number of disciplines were researched in order to provide a thorough search of the literature. Therefore, citations surfaced in such fields as Psychology, Communications, Future Studies, Business Management, Economics, Medicine, and History as well as that of Education itself. Appendix J provides an alphabetized list of those journals, as well as a corresponding set of techniques found therein.

Although the journal references noted in Appendix J are not assumed to be exhaustive, they represent a large contribution of references to be found in ID and related journals for the period 1947 to the present. However, an exception to other articles in the literature is Gentry's work entitled A Management Framework for Program Development Techniques (1980). In his article, Gentry introduces an ID approach model which he terms a Management Framework, that he recommends be used for organizing ID field techniques. He categorizes a sampling of such techniques according to the thirteen (13) functions of his model (see Appendix C), while at the same time providing definitions and references for each technique. His work parallels the present study in that he assembled a collection of techniques viewed as relevant to ID practitioners. This study will use his model as an organizer of ID techniques, and will match a list of the techniques that are researched with the thirteen functions of Gentry's model. Such a matching is based upon his prototype which may be found in Table 2.1 which follows.

TABLE 2.1

GENTRY'S LISTING OF TECHNIQUES

BY MANAGEMENT FRAMEWORK MODEL COMPONENTS

MODEL COMPONENTS	TECHNIQUES
Needs Analysis	Brainstorming, Criteria for Rejecting Clients, Delphi Technique, Fault Tree Analysis, Force-Field Analysis, Futures Wheel, Needs Assessment, Nominal Group Process, Scenario Writing.
Adoption	Brainstorming, Delphi Technique, Force-Field Analysis, Goal-Rating Procedure, Network Analysis.
Design	Contract Plan, Cost Benefit Analysis, Critical Path Method, Discovery Method, Ethnography, Function Analysis, Futures Wheel, Goal-Rating Procedure, Interaction Matrix Method of Sequencing Objectives, Interactive Television, Microteaching, Nominal Group Process, Peer Tutoring, Scenario Writing, Sequencing & Clustering Large Numbers of Objectives, Sequencing Content, Simulation, Storyboarding, Task Analysis, Team Teaching, Telelecture, Trigger Film.
Packaging	Field Testing, Formative Evaluation, Summative Evaluation, Time Study.
Installation	Critical Path Method, Fault Tree Analysis.
Operation	Information Mapping, Planning, Programming, Budgeting Systems, Personal Inverted Filing System, Summative Evaluation, Time Study.

TABLE 2.1 (cont'd.)

Evaluation	Field Testing, Force-Field Analysis, Formative Evaluation, Latent Image, Learners Verification and Revision -LVR, Stake Model, Summative Evaluation.
Communication Network	Content Analysis, Critical Path Method, Delphi Method, Information Mapping, Network Analysis.
Information Handling	Decision Tables, Information Mapping, Personal Inverted Filing System.
Resource Acquisition and Allocation	Cost Benefit Analysis, Management by Objectives, PPBS - Planning, Programing, Budgeting Systems.
Personnel	Broken Squares, Managerial Grid, Merit Rating Chart.
Facilities	Interactive Television, Telelecture.
Leadership	Brainstorming, Broken Squares, Content Analysis, Critical Path Method, Decision Tables, Delphi Method, Fault Tree Analysis, Flowcharting, Information Mapping, Management by Objectives, Managerial Grid, Merit Rating Chart, Nominal Group Process, Personal Inverted Filing System - PIFS, Program Evaluation and Review Technique - PERT, Relevance Trees, Task Analysis, Task Description, Team Teaching, Time Study.

In the summary of his article, Gentry asserts that such a framework for systematically organizing techniques:

> . . . alerts developers to the need for additional techniques, and to the need for objective research on the effectiveness, relevancy, and efficiency of existing techniques. (Gentry, 1980-81:36)

This study is designed to identify <u>which</u> techniques are being used by Canadian developers, in the period of 1980 to 1982. In addition, the study attempts to determine the levels of use in terms of relevancy, efficiency, and effectiveness of each technique as perceived by the survey population of developers in Canada.

The foregoing chapter illustrated that educational change may be brought about by technology. Specifically, one such technological field is that of Instructional Development, which affects change through the operationalized processes of various functions of ID systems models. In order to execute such processes, we discussed the use of numerous tactics or field techniques reported in the literature and it was further pointed out that techniques from other fields were also relevant to the needs of instructional developers. This "borrowing" or <u>hybrid principle</u> was acknowledged to be of significant importance to ID and the chapter continued with a discussion on the research of techniques employed in this study. In conclusion, the chapter pointed out the relevance of an article by Gentry and how it would serve as a prototype for this investigation.

CHAPTER III

DESIGN OF THE STUDY

This chapter is a review of the fundamental design of the study. Each of the ten questions that the study addresses are stated, and are followed by a discussion of the research population, the survey sample and the sampling procedures. The survey instrument, and the data collection procedures are dealt with next, followed by a plan for the analysis and interpretation of the raw data.

INTRODUCTION

As outlined in Chapter One, the study was designed to investigate knowledge and application levels of major instructional development techniques that are in current use by Canadian practitioners. Specifically, the researcher wanted to discover which techniques were being employed to a significant degree by the survey population, which were unfamiliar to the population, which techniques were perceived as being valuable to the field of Instructional Development, and which ones were actually being taught in Canadian institutions of learning. Further, the study ascertains if there were correlations between the level of technique use and employment areas of the surveyed developers, between the level of technique use and the educational training of the surveyed developers, and between the level of technique use and the number of years of teaching experience of the surveyed developers. Finally, the study culminates in a matching of the resulting major techniques (as perceived by the surveyed developers) with various functions of a recognized instructional development model.

RESEARCH QUESTIONS

In brief, the study is guided by the following questions:

1. What are the major techniques being employed by Canadian Instructional Developers in the field?
2. What is the developer's perceived level of competency with each technique?
3. What is the perceived relevancy of each technique as viewed by the developers?
4. How many of these techniques are unfamiliar to the developers?
5. Which of these techniques are currently being taught by Instructional Development programs and teacher education programs in Canadian graduate and undergraduate institutions of learning?
6. Is the number of years of teaching experience relative to the use of instructional development techniques? Which techniques?
7. Are the respective employment areas of the surveyed developers related to the level of technique use?

8. Is the graduate and/or post-graduate education of the developers related to the level of technique use?
9. Are the four Major Categories of Competency Level, Level of Use, Value to Instructional Development, and Degree to Which Institution Teaches, inter-related? (ie. Is there a relation between Level of Competency and Use, Competency and Value, etc.)
10. Given a typical instructional development model, how well do the perceived major techniques match with the required functions in the model?

In conclusion and based upon the responses to the above research questions, the research is designed to determine which instructional development techniques should be taught to students in graduate and/or teacher training institutions in Canada, based on expert preference.

RESEARCH POPULATION AND SAMPLE

A major task of the study was to identify those educators in Canada who were involved in Instructional Development activities. Although 47 universities in Canada offer courses in Educational Technology (Barre, 1978), the writer was not cognizant of any institution that provided degree programs in Instructional Development. The first attempt to identify educators who had a background in Instructional Development or ID-related programs, led to several established professionals in the Educational Technology field in Canada who were asked to suggest a list of names of those teachers involved in Instructional Development in Canada, and to act as validators of the study's survey instrument.

In all, nineteen (19) Canadian developers were approached for these two purposes. Discovering that each developer was a member of the Association of Media and Technology in Education in Canada (AMTEC), the researcher subsequently chose members of this organization as the survey population for the study. AMTEC is the Canadian equivalent of the AECT (Association for Educational Communications and Technology) in the United States of America.

Dr. Richard Lewis, Editor of Media Message, the journal and official publication of the Association of Media and Technology in Education in Canada, volunteered the support of the Media Message journal and its subsequent organizational machinery for surveying the membership. The survey was limited to those members who were connected with an educational institution, and excluded members of agencies or companies who were not. For example, all AMTEC members connected with non-educational organizations such as the National Film Board, the Secretary of State's office, Bell and Howell of Canada, etc., were deleted from the sample; further, all educational organizations that did not cite an individual's name on the AMTEC mailing list's address label were also ignored. Hence those members who were named and/or connected with an educational institution or educational-interfacing organization (such as TV Ontario and the Alberta Educational Communications Corporation) were chosen to make up the survey population. In all, 300 individuals made up the sample, chosen exclusively for their membership in AMTEC and their association with education related employment. It was reasoned that they would have the requisite training and employment position that would most likely require the practice of ID techniques.

INSTRUMENTATION

For purposes of developing a questionnaire, an initial search was made for existing field techniques currently used by instructional developers. The list was generated from professional journals (Appendix J) and numerous texts, many of which are found within the Bibliography of this study. The search resulted in a list of 108 techniques, which are listed in alphabetical order in Appendix A. The list is not intended to be exhaustive, but rather documents the more popular techniques used by instructional developers in educational and training institutions.

A panel of Field Experts were then identified to serve three purposes: First, they would adjudicate and validate the survey instruments. Second, they would recommend additional techniques that were not found in the initial search. Third, they would rate each of the techniques in terms of their perceived importance to the discipline of Instructional Development. This ranking would be used to delete the techniques perceived as least important from the study's main questionnaire.

Thirty Instructional Developers were identified from Canada and the United States to serve on the panel of field experts. All were employed in post-secondary school institutions and each was a recognized professional in his/her field. In November, 1979, all thirty Field Experts were sent a letter (Appendix E) requesting their participation. They included fourteen (14) from the United States and sixteen (16) from Canada. In early June, 1980, a package of instruments and documents was sent to each of the panel members. The package (Appendix F) included one each of the following:

1. Questionnaire Survey: Technique Response Form
2. List of Techniques Definitions and References
3. Technique Rating Instrument
4. Form for Additional Techniques
5. Form for Suggestions and Comments
6. Covering Letter and Field Expert Instructions

Items numbered 1 and 2 above would be included in the final survey instrument sent to the total survey population. Information from item number 5 would provide the researcher with suggestions for strengthening the quality of the final survey instrument as well as provide the Field Experts with an opportunity for recommending improvements to the study and research instruments. Number 4 allowed the Field Expert to suggest any additional technique(s) that were not included in the original list, and number 3 was designed to allow the expert to rate each technique as to its importance in conducting instructional development activities.

Reminder notices were sent to late returnees and by December 1980 twenty-five (25) Field Experts had responded for a return of 83.33%. Specifically, 13 of the original 14 American Experts had responded for a total of 92.86%. Of these, eight (8) approved the study either in total or with slight modifications, representing 61.54% approval; five (5) respondents representing 38.46% expressed reservations that could have been interpreted as disapproval for the instrumentation and/or study. In terms of the Canadian Field Experts, 12 of the original 16 panel members responded in the same time frame, which represented a total of 75.00% return. Of these, 100% approved the study either in total or with slight modification.

Based on the data received from the panel of Field Experts, the initial questionnaire was revised in preparation for sending it to the selected survey population of Canadian Instructional Developers.

With regard to the Techniques Rating Instrument (as per number 3 of the Field Expert package above), the Field Experts had rated each of the 108 techniques on a 0 to 4 scale, with 0 representing "no value or not a recognized technique", 1 representing "low value" to ID activities, 2 indicating "valuable", 3 equalling "high value", and 4 standing for "extremely high value" to Instructional Development activities. In this manner, each technique in the rating instrument returned by the panel members was totaled as to its aggregate score and thence divided by the number of experts (25) in order to establish an average rating. The techniques were then ordered as to their respective ranks and a cut-off score was established at 1.50 (see Appendix G). In this manner, sixty (60) techniques remained. However, as GAMING and SIMULATION are often considered together in the literature, it was decided to collapse the data on the two into one technique, that of SIMULATION, which resulted in fifty-nine (59) techniques. Further, as IMMEDIATE FEEDBACK was felt to be a sub-set of FEEDBACK, it was decided to collapse the two into one technique, that of FEEDBACK, which resulted in fifty-eight (58) techniques. Finally INSTRUCTIONAL ANALYSIS KIT and PROGRAMMED INSTRUCTION were added to the list, two more techniques which were suggested by field experts. Thus, the final survey instrument (APPENDIX H) consisted of sixty (60) field techniques.

The survey questionnaire was published in the Media Message journal, accompanied by self-addressed, stamped envelopes, to facilitate the return of the completed questionnaire. The instrument itself was divided into three major sections (Appendix H), under the title of A Study to Identify Major Field Techniques and Utilization Levels of Canadian Instructional Developers, (Media Message, 10:3, pp. 16-23). The first section introduced the survey and explained its purpose and benefits to the AMTEC organization. The second portion listed the sixty (60) techniques in alphabetical order, and provided appropriate definitions and references for each. The final section was composed of the survey questionnaire, complete with response directions, declaration of anonymity and confidentiality, and respondent's background and experiential profile; the remainder of this section was composed of a series of response cells to each survey technique that was designed to determine the respondent's levels of competency and usage, as well as the perceived value to ID and the degree to which his/her institution teaches the technique in question.

In order to acquire a significantly high level of response from the membership of AMTEC, the researcher acquired a mailing list, from which he was able to select his survey sample (as noted earlier in this chapter), and to whom a target letter was sent which solicited a response to the questionnaire. To reiterate, the final sample consisted of individuals 1) who were members of AMTEC, 2) were members of educational or educationally related institutions, and 3) whose names appeared on AMTEC's mailing list. In all, 300 individuals were selected.

DATA COLLECTION PROCEDURES

The survey was originally published in Media Message, and mailed to the AMTEC membership in April, 1981 and in the same month target letters were sent to the 300 sample members. From that time until the end of August, thirty (30) responses were received for a total of 10% of the survey population. On September 1, 1981 a second mailing which included a copy of the originally published survey instrument was sent to members of the sample who had not yet responded and by the end of November, 1981, forty-three (43) or an additional 14.33% responses were received. A third mailing of the survey was made on December 1, 1981; by early February, 1982, another thirty-seven (37) returns or an additional 12.33% had been received. Finally, on February 17, 1982, a reminder card was sent out to each of the remaining members of the survey population. In answer, an additional two (2) responses, (.66%) were received. Hence, after a total of four mailings, the researcher had received 112 responses to his questionnaire which represented a total of 37.33% return.

ANALYSIS OF DATA

A code number was assigned to each possible response and IBM Fortran Coding Forms (#GX09-0011-6 U/M050) were utilized which contained the coded responses to the

248 items on the questionnaire. From the coded sheets, computer cards were punched and programs were run for analysis at the McMaster University Computer Centre, in Hamilton, Ontario.

Computer analysis of the data was accomplished by the Statistical Package for the Social Sciences or S.P.S.S. (Nie, 1975), which measured frequencies and cross tabulations; the measured frequency counts added up and sorted out the data, as well as provided column and row percentages, while the cross tabs showed the relationship between two or more variables in a table. Significance, where applicable, was tested by the use of F-ratio and the hypotheses were tested at the .05 level.

Specifically, the questions considered by the study were addressed as follows:

For Question 1 (What are the major techniques being employed by Canadian Instructional Developers in the field?), an SPSS Batch System computer run was made of the survey population's responses to the "B" cells on the questionnaire (LEVEL OF USE). The results were then listed in numerical order by mean, with the highest rated techniques being regarded as the major ones employed in the field and the lowest rated techniques being regarded as the least major ones. The actual separation of major techniques from minor techniques was based upon the placement of their means as presented in Figure 3.1 which provides an equal distribution of the four response levels.

FIGURE 3.1

HI	MED	LO	NONE
3.00 - 2.26	2.25 - 1.51	1.50 - 0.76	0.75 - 0.00

If a technique fell within the "HI" (3.00 - 2.26) and "MEDIUM" (2.25 - 1.51) ranges above, then it was considered to be a major technique. If, however, the technique fell within the "LO" (1.50 - 0.76) and "NONE" (0.75 - 0.00) ranges, then it was classified as a minor technique.

Similarly for Question 2 (What is the developer's perceived level of competency with each technique?), the highest rated technique by mean with regard to the responses in questionnaire cell "A" (COMPETENCY LEVEL) would reveal the highest regarded techniques in terms of the respondents' perceived competency levels. Conversely, the lowest rated techniques by mean in the level of competency would provide the answer to Question 4 (How many of these techniques are unfamiliar to the developers?). The survey instrument required respondents to indicate their level of competency as "NIL", "HI", "MED" or "LO". Quantitatively, "HI" will be indicated by a score of 3.00 to 2.26, "MED" by a score of 2.25 to 1.51, and "LO" by a score of 1.50 to 0.76, according to Figure 3.1 above. "NIL" will be indicated by a score of 0.75 to 0.00; therefore the answer to Question 4 will be determined by those techniques falling within the "NIL" range.

In a like manner, Question 3 (What is the perceived relevancy of each technique as viewed by the developers?), the highest rated techniques by <u>mean</u> with regard to the responses in Questionnaire cell "C" (VALUE TO INSTRUCTIONAL DEVELOPMENT), would reveal the highest regarded techniques in terms of the respondents' perceived relevancy level. Again, Figure 3.1 is consulted in order to determine which techniques are to be construed as most valuable to the field of Instructional Development: those techniques with <u>means</u> in the "HI" and "MEDIUM" ranges (3.00 to 1.51) would be designated as the most relevant or valuable to ID.

Question 5 (Which of these techniques are currently being taught by Instructional Development programs and teacher education programs in Canadian graduate and under-graduate institutions of learning?) would be answered in the following manner: the techniques with <u>means</u> in the SPSS Batch System Computer run in questionnaire cell "D" that fell within the "HI" (3.00 - 2.26), "MEDIUM" (2.25 - 1.51), and "LO" (1.50 - 0.76) ranges according to Figure 3.1 above, would be considered to be those techniques which are currently being taught by ID programs in Canada. Those techniques with a <u>mean</u> score of 0.75 and below would be considered not significant enough for inclusion in the list of techniques being currently taught by the respondents of the sample population.

With regard to Question 6 (Is the number of years of teaching experience relative to the use of techniques? Which techniques?), the number of years of teaching or educational work experience as per question #2 on the survey questionnaire was correlated with the level of use scores as per the data in Question 1. A PEARSON CORRELATION was employed and those techniques with a coefficient of .1900 and greater would be recognized as being relative to the number of years of teaching experience of the respondents.

In terms of Question 7 (Are the respective employment areas of the surveyed developers related to the level of techniques use?), a one-way analysis of variance (ANOVA) was computed between the Level of Use score for each individual (as per questionnaire cell "B") and their respective job responsibility (as per questionnaire question no. 6). Significance would be tested at the .05 level. For Question 8 (Is the graduate and/or post-graduate education of the developers related to the level of technique use?), another one-way ANOVA was computed between the Level of Use score and the Level of Highest Education (as per questionnaire question no. 3), as well as between the Level of Highest Education and Competency Level, Value to Instructional Development, and Degree to which Institution Teaches (cells A, C & D of questionnaire). Once again, significance was established at .05 level.

To address Question 9 (Are the four major categories of Competency Level, Level of Use, Value of Instructional Development, and Degree to Which Institution Teaches interrelated?), the researcher ran another PEARSON CORRELATION. Significance was established at the .05 level, and the correlation was tested for each of the sixty techniques researched in the study.

In order to answer Question 10 (Given a typical instructional development model, how well do the techniques being used by Canadian Instructional Developers match the required functions in the model?) and subsequently conclude the study, a list of field techniques, their respective definitions and relevant bibliographic information were sent back to each of the original Field Experts (Appendix D) who validated the survey instrument. The list was composed of those techniques that were used by the Canadian instructional developers in the survey population (ie. those techniques which scored a mean within the "HI" (3.00 - 2.26), "MEDIUM" (2.25 - 1.51), or "LO" (1.50 - 0.76) ranges of cell "B" of the survey instrument; those techniques with a mean within the "NONE" range of 0.75 - 0.00 were not considered in this portion of the study). Along with this list of techniques, copies of Gentry's Management Framework Model (Appendix C) were sent, with the request that the field experts match the techniques to appropriate functions or components of the model. A sample page of the Field Expert Response Form may be found in Appendix K. Thus, with the information generated by the results from the above, the study could recommend which techniques (as determined by this research) could be matched with the functions of Gentry's Management Framework model.

The preceeding chapter has dealt with the design of the study. It began with a statement of each of the ten questions addressed by the study, followed by a discussion on the research population, the survey sample and the sampling procedures used in the study. Further, the chapter outlined the composition of the survey instrument as well as the data collection procedures. In conclusion, the chapter dealt with the analysis and interpretation procedures of the raw data.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The presentation and analysis of the data are contained in this chapter. Each of the ten major questions addressed in the study will be considered in order, and an analysis of the data generated in the study will be presented, accompanied by supporting tables of information.

Question One: What are the Major Techniques Being Employed by Canadian Instructional Developers in the Field?

In order to address this question, an S.P.S.S. Batch System computer run was made of the survey population's responses to the "B" cells on the questionnaire (LEVEL OF USE), in Appendix H. Each technique of the 112 returned questionnaires was totaled according to the scale of "3" representing "HI", "2" representing "MEDIUM", "1" representing "LO", and "0" representing "NONE". A mean was then determined for each of the techniques and the Techniques were then ordered from 1 to 60 with the first technique representing the one with the highest mean, while the sixtieth technique received the lowest mean score.

In this manner, it was discovered that FEEDBACK with a mean of 1.86 was the most used technique, BRAINSTORMING with a mean of 1.70 was next most used, while GANNT CHART with a mean of 0.25 was the least used. The quantitative results for this question are found in Table 4.1, which illustrates the ranking of the sixty (60) techniques by MEANS with their respective STANDARD DEVIATIONS.

It was previously determined in Chapter III that a technique would be classified as major if it fell within the "HI" (3.00 - 2.26) or "MEDIUM" (2.25 - 1.51) ranges of Figure 3.1. Accordingly, this study illustrated (see Table 4.1) that only nine (9) techniques may be deemed to be major: Feedback, Brainstorming, Field Test, Needs Assessment, Long-Range Planning, Multi-Image/Multi-Media Presentation, Questionnaire, Literature Search, and Flow-charting are those field techniques that were determined to be the major ones being used by Canadian Instructional Developers. The remaining fifty-one techniques fell within the "LO" or "NONE" categories and according to the parameters of this study, they cannot be classified as major techniques. However, this is not to be interpreted to mean that the other techniques are not valuable, merely that they are not often employed or not known by the respondents.

TABLE 4.1

LEVEL OF USE

	RANK	TECHNIQUE	MEAN	S.D.
*	1	Feedback	1.86	1.15
*	2	Brainstorming	1.70	1.02
*	3	Field Test	1.68	1.19
*	4	Needs Assessment	1.67	1.10
*	5	Long-Range Planning	1.66	1.05
*	6	Multi-Image/Multi-Media Pres.	1.62	1.01
*	7	Questionnaire	1.60	1.09
*	8	Literature Search	1.54	1.15
*	9	Flowcharting	1.51	1.02
	10	Story Boarding	1.50	1.13
	11	Sequencing of Objectives	1.49	1.13
	12	Checklists	1.41	1.03
	13	Management by Objectives	1.41	1.12
	14	Formative Evaluation	1.38	1.18
	15	Task Analysis (Task Desc.)	1.37	1.20
	16	Summative Evaluation	1.35	1.18
	17	Bloom's Taxonomy	1.29	1.07
	18	Content Analysis	1.29	1.14
	19	Case Studies	1.25	1.06
	20	Interviewing Users	1.24	1.21
	21	Computer Search	1.18	1.05
	22	Appraisal Interview	1.15	1.09
	23	Discovery Technique	1.11	1.08
	24	Criterion Referenced Meas.	1.10	1.09
	25	Simulation (Gaming)	1.06	1.06
	26	Authoritative Opinion	1.01	1.05
	27	Cost-Benefit Analysis	1.00	1.10
	28	Role Playing	.99	.98
	29	Computer Assisted Instruct.	.96	.96
	30	Programmed Instruction	.96	.89
	31	Behaviour Modelling	.92	1.02
		Standardized Tests	.92	.98
	33	Learner Verification & Revision	.88	1.12
	34	Micro Teaching	.86	.99
	35	Likert Scale	.80	1.07
	36	Technical Conference	.79	1.02
	37	Contract Plan	.79	.97
	38	Program Plan. Budget. System	.78	1.04
	39	Gagne's Taxonomy	.78	.95
	40	Program Eval. Review Tech.	.77	.93
	41	Linear Programming	.66	.90
	42	Critical Path Method (CPM)	.53	.85
	43	Krathwohl's Taxonomy	.47	.86
	44	Function Analysis	.47	.83
	45	Observation Interview (eg. Time-Motion Studies)	.46	.72
	46	Instructional Analysis Kit	.42	.85
	47	Cognitive Mapping	.41	.77
	48	Discrepancy Evaluation	.41	.70
	49	Information Mapping	.38	.76
	50	Critical Incidents Technique	.37	.76
		Nominal Group Process	.37	.76
	52	Stake Model (Evaluation)	.37	.75
	53	In-Basket Technique	.34	.68
	54	Decision Tables	.34	.67
	55	Delphi Technique	.33	.68
	56	Card Sort	.33	.64
	57	Shaping	.30	.70
	58	Mathetics	.28	.71
	59	Force-Field Analysis	.27	.60
	60	Gannt Chart	.25	.68

(* = Major Field Techniques)

Question Two: What is the Developer's Perceived Level of Competency with each Technique?

As with question one, an S.P.S.S. Batch System computer analysis was made of the population's response to cell "A" (COMPETENCY LEVEL). Once again, the 112 respondents' responses for each technique were totalled and as illustrated in Table 4.2 the techniques were ranked according to mean. Thus it was discovered that the technique which the sample population appeared most competent with was that of MULTI-IMAGE/MULTI-MEDIA PRESENTATION, which received a mean of 2.20, while the least competent appraised technique was MATHETICS with a mean of 0.39.

As in the case of Question 1, it was determined in Chapter III that a technique with which the sample population appeared most competent would fall within the "HI" (3.00 - 2.26) or "MEDIUM" (2.25 - 1.51) ranges of Figure 3.1 . Accordingly, this study illustrated (see Table 4.2) that the top ranked twenty-eight (28) techniques would be classified as those with which the sample population felt competent (ie. MULTI-IMAGE/MULTI-MEDIA PRESENTATION in first place to CRITERION REFERENCED MEASUREMENT in twenty-eighth place). The remaining 32 techniques would not therefore fall within this classification.

TABLE 4.2

COMPETENCY LEVEL

	RANK	TECHNIQUE	MEAN	S.D.
*	1	Multi-Image/Multi-Media Pres.	2.20	.99
*	2	Feedback	2.08	1.12
*		Needs Assessment	2.08	1.12
*	4	Brainstorming	2.07	.96
*	5	Story Boarding	2.06	1.21
*	6	Questionnaire	2.03	1.10
*	7	Long-Range Planning	1.98	1.10
*	8	Field Test	1.96	1.14
*	9	Flowcharting	1.90	1.10
*	10	Management by Objectives	1.88	1.17
*	11	Bloom's Taxonomy	1.84	1.14
*	12	Checklists	1.84	1.15
*	13	Literature Search	1.84	1.23
*	14	Programmed Instruction	1.82	1.11
*	15	Formative Evaluation	1.76	1.27
*	16	Role Playing	1.71	1.06
*	17	Sequencing of Objectives	1.71	1.23
*	18	Summative Evaluation	1.71	1.27
*	19	Standardized Tests	1.65	1.10
*	20	Case Studies	1.65	1.17
*	21	Computer Search	1.60	1.17
*	22	Micro Teaching	1.60	1.18
*	23	Task Analysis (Task Desc.)	1.59	1.24
*	24	Content Analysis	1.58	1.17
*	25	Interviewing Users	1.57	1.31
*	26	Discovery Technique	1.53	1.15
*	27	Appraisal Interview	1.52	1.19
*	28	Criterion Referenced Meas.	1.52	1.20
	29	Simulation (Gaming)	1.49	1.19
	30	Computer Assisted Instruct.	1.46	1.08
	31	Cost-Benefit Analysis	1.34	1.17
	32	Behaviour Modelling	1.29	1.10
	33	Authoritative Opinion	1.26	1.11
	34	Program Eval. Review Tech.	1.23	1.20
	35	Contract Plan	1.21	1.14
	36	Gagne's Taxonomy	1.20	1.21
	37	Prog. Plan. Budget. System	1.18	1.22
	38	Linear Programming	1.13	1.19
	39	Learner Verification & Revis.	1.13	1.21
	40	Likert Scale	1.06	1.22
	41	Technical Conference	1.00	1.15
	42	Critical Path Method (CPM)	.88	1.14
	43	Observation Interview (eg. Time-Motion Studies)	.87	.99
	44	In-Basket Technique	.79	1.07
	45	Cognitive Mapping	.78	1.01
	46	Krathwohl's Taxonomy	.77	1.09
+	47	Delphi Technique	.71	1.03
+	48	Shaping	.71	1.04
+	49	Card Sort	.71	1.06
+	50	Function Analysis	.64	1.00
+	51	Information Mapping	.63	1.01
+	52	Discrepancy Evaluation	.63	1.02
+	53	Instructional Analysis Kit	.57	1.03
+	54	Decision Tables	.56	.94
+	55	Critical Incidents Technique	.54	.96
+	56	Nominal Group Process	.53	.93
+	57	Stake Model (Evaluation)	.49	.88
+	58	Force-Field Analysis	.47	.39
+	59	Gannt Chart	.45	.93
+	60	Mathetics	.39	.34

(* = Significant competency among surveyed developers)
(+ = Unfamiliar to surveyed developers)

Question Three: What is the Perceived Relevancy of Each Technique as Viewed by the Developers?

Once again an S.P.S.S. analysis was utilized with the data being acquired from the responses to questionnaire cell "C" (VALUE TO INSTRUCTIONAL DEVELOPMENT). As did occur in question one and two, the results of the Batch System run was prioritized according to the mean of the techniques and it was revealed that the technique felt most valuable by the sample population was FEEDBACK with a mean of 2.11, while the least valuable was scored as CARD SORT with a mean of 0.36. Complete results of this question may be found in Table 4.3.

Again, it was determined in Chapter III that a technique would be classified as valuable to Instructional Development if it fell within the "HI" (3.00 - 2.26) or "MEDIUM" (2.25 - 1.51) ranges of Figure 3.1. Accordingly, this study illustrated (see Table 4.3) that the top ranked twenty (20) techniques would be classified as being valuable to Instructional Development (ie. FEEDBACK in first place to SUMMATIVE EVALUATION in twentieth place). The remaining 40 techniques would not therefore fall within the "valuable" classification in terms of this study.

TABLE 4.3

VALUE TO INSTRUCTIONAL DEVELOPMENT

	RANK	TECHNIQUE	MEAN	S.D.
*	1	Feedback	2.11	1.20
*	2	Long-Range Planning	1.98	1.14
*	3	Needs Assessment	1.97	1.18
*	4	Field Test	1.96	1.23
*	5	Brainstorming	1.92	1.01
*	6	Multi-Image/Multi-Media Pres.	1.90	.99
*	7	Story Boarding	1.78	1.19
*	8	Computer Assisted Instruct.	1.77	1.16
*	9	Flowcharting	1.75	1.10
*	10	Literature Search	1.71	1.20
*	11	Sequencing of Objectives	1.71	1.26
*	12	Formative Evaluation	1.69	1.29
*	13	Questionnaire	1.63	1.12
*	14	Bloom's Taxonomy	1.60	1.20
*	15	Content Analysis	1.60	1.24
*	16	Management by Objectives	1.59	1.12
*	17	Computer Search	1.58	1.18
*	18	Criterion Referenced Meas.	1.56	1.23
*	19	Task Analysis (Task Desc.)	1.55	1.28
*	20	Summative Evaluation	1.51	1.24
	21	Interviewing Users	1.43	1.29
	22	Case Studies	1.42	1.18
	23	Appraisal Interview	1.41	1.24
	24	Programmed Instruction	1.39	1.00
	25	Micro Teaching	1.36	1.16
	26	Checklists	1.35	1.05
	27	Discovery Technique	1.33	1.13
	28	Simulation (Gaming)	1.31	1.17
	29	Standardized Tests	1.30	1.06
	30	Role Playing	1.27	1.08
	31	Cost-Benefit Analysis	1.23	1.15
	32	Learner Verification & Revis.	1.19	1.28
	33	Behaviour Modelling	1.16	1.14
	34	Authoritative Opinion	1.12	1.14
	35	Gagne's Taxonomy	1.06	1.16
	36	Contract Plan	1.05	1.07
	37	Prog. Eval. Review Technique	1.05	1.29
	38	Program Plan. Budget. System	1.00	1.12
	39	Likert Scale	.95	1.15
	40	Technical Conference	.94	1.08
	41	Linear Programming	.85	.99
	42	Cognitive Mapping	.84	1.13
	43	Critical Path Method (CPM)	.79	1.04
	44	Observation Interview (eg. Time-Motion Studies)	.70	.90
	45	Krathwohl's Taxonomy	.65	1.03
	46	Discrepancy Evaluation	.63	1.01
	47	Function Analysis	.62	.97
	48	Delphi Technique	.62	.92
	49	Critical Incidents Technique	.54	.95
	50	Information Mapping	.53	.93
	51	Shaping	.53	.93
	52	Decision Tables	.53	.86
	53	Instructional Analysis Kit	.52	.97
	44	In-Basket Technique	.49	.78
	55	Nominal Group Process	.48	.90
	56	Stake Model (Evaluation)	.43	.85
	57	Gannt Chart	.38	.82
	58	Mathetics	.38	.81
	59	Force-Field Analysis	.37	.79
	60	Card Sort	.36	.71

(* = Valuable to Instructional Development)

<u>Question Four</u>: <u>How Many of the Techniques are Unfamiliar to the Developers</u>?

In order to respond to this question, the researcher was able to consult Table 4.2 and note those techniques that received the lowest mean score for COMPETENCY LEVEL. Specifically, those techniques that received mean scores within the "NIL" (0.75 - 0.00) range of Figure 3.1 would be classified as <u>unfamiliar</u> to the developers of the survey population. The rationale for this is found within the instructions of question 8 of the survey questionnaire which states "Please Note: If you are NOT FAMILIAR with a technique, please check the Nil box in category A and go to the next technique".

Accordingly, this study determined (see Table 4.2) that the techniques with mean scores of 0.75 or below were those techniques numbering in order from forty-seventh place (DELPHI) to sixtieth place (MATHETICS). Therefore the bottom ranked fourteen techniques (see Table 4.2 on page 57) would be classified as <u>unfamiliar</u> to the developers surveyed in this study.

<u>Question Five</u>: <u>Which of These Techniques are Currently Being Taught by Instructional Development Programs and Teacher Education Programs in Canadian Graduate and Undergraduate Institutions of Learning</u>?

To address this question, another S.P.S.S. batch run was performed in order to analyse the results of questionnaire cell "D" (DEGREE TO WHICH INSTITUTION TEACHES). The results may be found in Table 4.4 and reveal that the technique which appears to be taught to the greatest degree by the sample developers was MULTI-IMAGE/MULTI-MEDIA PRESENTATION with a mean score of 0.63 while FORCE-FIELD ANALYSIS with a mean of 0.04 appears to be taught least. However, as was outlined in Chapter III with regard to this question, 0.75 was used as a minimum mean score of significance (which would still average a rating of "NOT APPLICABLE" in cell "D" according to Figure 3.1). Thus it is immediately apparent that all of the techniques fall below the significance level. Hence, it may be reasoned that most techniques are not being presently taught in a formal manner at the institutions employing the members of the survey population. This consideration will be dwelt upon to a greater extent in the summary and findings section of Chapter V.

TABLE 4.4

DEGREE TO WHICH INSTITUTION TEACHES

RANK	TECHNIQUE	MEAN	S.D.
1	Multi-Image/Multi-Media Pres.	.63	1.06
2	Formative Evaluation	.63	1.13
3	Feedback	.60	1.11
4	Summative Evaluation	.56	1.05
5	Literature Search	.54	1.04
6	Bloom's Taxonomy	.53	.96
7	Standardized Tests	.52	.96
8	Computer Assisted Instruct.	.51	.95
9	Criterion Refer. Measurement	.50	.97
10	Story Boarding	.49	.96
11	Task Analysis (Task Desc.)	.49	.93
12	Needs Assessment	.48	.88
13	Questionnaire	.46	.92
	Sequencing of Objectives	.46	.92
15	Long-Range Planning	.46	.89
16	Field Test	.45	.94
17	Micro Teaching	.43	.89
18	Programmed Instruction	.43	.85
	Simulation (Gaming)	.43	.85
20	Brainstorming	.41	.79
21	Management by Objectives	.38	.76
22	Discovery Technique	.37	.81
23	Flowcharting	.37	.77
	Content Analysis	.37	.77
25	Role Playing	.37	.75
26	Interviewing Users	.36	.81
27	Case Studies	.36	.79
28	Computer Search	.35	.78
29	Learner Verification & Revision	.34	.83
30	Gagne's Taxonomy	.33	.74
31	Behaviour Modelling	.32	.71
32	Likert Scale	.31	.77
33	Checklists	.29	.68
34	Linear Programming	.28	.71
35	Appraisal Interview	.28	.65
36	Krathwohl's Taxonomy	.26	.73
37	Authoritative Opinion	.26	.69
38	Program Eval. Review Technique	.26	.68
39	Contract Plan	.26	.61
40	Cost-Benefit Analysis	.21	.57
41	Cognitive Mapping	.18	.56
42	Critical Path Method (CPM)	.17	.50
43	Delphi Technique	.16	.48
44	Instructional Analysis Kit	.15	.57
45	Information Mapping	.14	.50
46	Program Plan. Budget. System	.13	.46
47	Stake Model (Evaluation)	.13	.45
	Discrepancy Evaluation	.13	.45
49	Technical Conference	.13	.43
50	Critical Incidents Technique	.13	.41
51	Decision Tables	.12	.46
52	Shaping	.12	.44
53	In-Basket Technique	.11	.39
54	Function Analysis	.10	.40
55	Observation Interview (eg. Time-Motion Studies)	.09	.32
56	Mathetics	.08	.38
57	Nominal Group Process	.08	.36
58	Gannt Chart	.07	.29
59	Card Sort	.06	.24
60	Force-Field Analysis	.04	.19

Question Six: Is the Number of Years of Teaching Experience Relative to the Use of Techniques? Which Techniques?

In order to respond to this question, a PEARSON CORRELATION was performed using the data generated in Table 4.1 (LEVEL OF USE) and the number of years of teaching or educational work experience, as per question 2 of the survey instrument questionnaire. The correlation data provided the researcher with a coefficient and significance level for each of the 60 techniques under consideration; such illustrated whether there was a relationship between the number of years of professional work experience of the surveyed developers and the use of each of the techniques.

Upon analysing the results of the computer run of the Pearson Correlation, it was revealed that very few of the field techniques exhibited a relationship between use and user work experience. Employing .1900 as a level of coefficient significance, it was determined that only five (5) techniques exhibited the above mentioned relationship. According to Table 4.5 the only techniques revealing a relationship were DELPHI TECHNIQUE (.2270), INSTRUCTIONAL ANALYSIS KIT (.1934), MICRO TEACHING (.2107), PROGRAM PLANNING BUDGETING SYSTEM (.2101), and ROLE PLAYING (.2181). The remaining fifty-five techniques did not according to the statistical analysis of this study exhibit a significant level of correlation between the number of years of teaching experience of the surveyed developers and the level of use of technique.

TABLE 4.5

PEARSON CORRELATION BETWEEN USE OF TECHNIQUE AND USER TEACHING EXPERIENCE

	TECHNIQUE	COEFFICIENT	SIGNIFICANCE
1	Appraisal Interview	.0566	.277
2	Authoritative Opinion	.1443	.065
3	Behaviour Modelling	.0584	.270
4	Bloom's Taxonomy	.1027	.141
5	Brainstorming	.0124	.448
6	Card Sort	.2300	.007
7	Case Studies	.0532	.289
8	Checklists	.0876	.179
9	Cognitive Mapping	.0468	.312
10	Computer Assisted Instruct.	.1481	.060
11	Computer Search	.0144	.440
12	Content Analysis	.0736	.220
13	Contract Plan	.1183	.107
14	Cost-Benefit Analysis	.1011	.144
15	Criterion Referenced Measurement	.0289	.381
16	Critical Incidents Technique	.1083	.128
17	Critical Path Method (CPM)	.1287	.088
18	Decision Tables	.0647	.249
* 19	Delphi Technique	.2270	.008
20	Discovery Technique	.0823	.194
21	Discrepancy Evaluation	.1436	.065
22	Feedback	.0142	.441
23	Field Test	.0623	.257
24	Flowcharting	.0222	.408
25	Force-Field Analysis	.1631	.043
26	Formative Evaluation	.0297	.378
27	Function Analysis	.0858	.184
28	Gagne's Taxonomy	.0163	.432
29	Gannt Chart	.1191	.105
30	In-Basket Technique	.1432	.066
31	Information Mapping	.0372	.348
* 32	Instructional Analysis Kit	.1934	.021
33	Interviewing Users	.0696	.233
34	Krathwohl's Taxonomy	.0022	.491
35	Learner Verification & Revision	.0210	.413
36	Likert Scale	.0118	.451
37	Linear Programming	.1499	.057
38	Literature Search	.0043	.482
39	Long-Range Planning	.1258	.093
40	Management by Objectives	.0212	.412
41	Mathetics	.0294	.379
* 42	Micro Teaching	.2107	.013
43	Multi-Image/Multi-Media Present.	.0237	.402
44	Needs Assessment	.1139	.116
45	Nominal Group Process	.1673	.039
46	Observation Interview (eg. Time-Motion Studies)	.0405	.336
47	Programmed Instruction	.1239	.097
48	Program Evaluation Review Tech.	.1344	.079
* 49	Program Plan. Budget. System	.2101	.013
50	Questionnaire	.1217	.410
* 51	Role Playing	.2181	.010
52	Sequencing Objectives	.0641	.251
53	Shaping	.0343	.360
54	Simulation (Gaming)	.0285	.383
55	Stake Model (Evaluation)	.0951	.159
56	Standardized Tests	.0934	.164
57	Story Boarding	.0446	.320
58	Summative Evaluation	.0117	.451
59	Task Analysis (Task Desc.)	.0870	.181
60	Technical Conference	.0359	.353

(* = Significant correlation between Years Teaching Experience and Technique Use.)

Question Seven: Are the Respective Employment Areas of the Surveyed Developers Related to the Level of Technique Use?

In order to ascertain whether or not the respective job responsibilities or Employment Areas of the surveyed developers are related to the level of technique use, a one-way analysis of variance (ANOVA) was performed between the Level of Use (cell "B" on the questionnaire) and the Title or Present Job Responsibility (as per questionnaire question no. 6).

The results of the computer analysis may be found in Table 4.6 (A) which presents data on the respective means, standard deviation, and standard error. It was determined that there is no statistical significance at the .05 level ($F_{9, 99} = .932$, $p = .5009$).

However, it was reasoned that perhaps there were too many Job Responsibility categories in order to provide a significant relationship. Therefore, in order to test the difference among the means, the number of Job Responsibility responses were collapsed into 5 categories or groups. Such may be found in Figure 4.1 which follows.

FIGURE 4.1

New Group	Title	Old Group(s)
1	Administrators	1
2	University & College Instr.	2, 10
3	Teachers / Consultants	3, 4, 5, 8, 9
4	Support Staff	6, 7
5	Others	11

As illustrated in Table 4.6(B), there is a definite trend in relationship between the Level of Use and the Present Job Responsibilities, which follows the above ordered categories; ie. the Administrators category has a larger mean than the University and College Instructors category, which in turn has a larger mean than the Teachers and Consultants category, which in turn has a larger mean than the Support Staff of Audiovisual Technicians and Librarians category, etc. However, in spite of this trend, no two groups are significantly different at the .05 level ($F_{4,\ 104}$ = 1.350, p = .2567). There would be a 26% chance of error when suggesting that a significant difference existed.

Hence, in summary, it must be asserted that although a trend does exist, there is no statistically significant evidence to suggest that the respective employment areas of the surveyed developers are related to the level of technique use, with regard to this study.

TABLE 4.6(A)

ANOVA BETWEEN LEVEL OF TECHNIQUE USE AND PRESENT JOB RESPONSIBILITIES

(ORIGINAL JOB CATEGORIES)

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	9	7487.6701	831.9633	.932	.5009
Within Groups	99	88350.8013	892.4323		
Total	108	95838.4688			

GROUP	COUNT	MEAN	STANDARD DEVIATION	STANDARD ERROR
1	30	62.9333	33.6687	6.1470
2	1	47.0000		
3	18	57.6667	32.3656	7.6286
5	1	62.0000		
6	4	30.2500	15.3704	7.6852
7	3	48.3333	23.5018	13.5688
8	5	36.2000	12.0499	5.3889
9	4	47.2500	38.5519	19.2760
10	21	61.0476	25.3722	5.5367
11	22	52.6364	29.2290	6.2317
TOTAL	109	56.0642	29.7891	2.8533

TABLE 4.6(B)

ANOVA BETWEEN LEVEL OF TECHNIQUE USE AND PRESENT JOB RESPONSIBILITIES

(COLLAPSED JOB CATEGORIES)

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	4	4729.2763	1182.3188	1.350	.2567
Within Groups	104	91109.1870	876.0498		
Total	108	95838.4531			

GROUP	COUNT	MEAN	STANDARD DEVIATION	STANDARD ERROR
1	30	62.9333	33.6687	6.1470
2	22	60.4091	24.9412	5.3175
3	28	52.5000	30.3419	5.7341
4	7	38.0000	19.8914	7.5182
5	22	52.6364	29.2290	6.2317
TOTAL	109	50.0642	29.7891	2.8533

Question Eight: Is the Graduate and/or Post-Graduate Education of the Developers Related to the Level of Technique Use?

To determine whether or not a relationship existed between the level of technique use and the user's graduate and/or post-graduate education, an analysis of variance or a one-way ANOVA was performed between the Level of Use score (cell "B" on the questionnaire) and the Level of Highest Education (as per questionnaire question no. 3). It was concluded that no two groups are significantly different at the .05 level as the F Probability was P = .4144 (see Table 4.7). However, an interesting pattern did appear as is illustrated by Table 4.8 wherein one may see an increasing trend whereby respondents with a higher level of education have a greater mean score. Hence, it may be suggested that those members of the survey population with a PhD. make greater use of the field techniques than those with a masters degree, who in turn make more use of the techniques than those with a bachelors degree, and so on. However, it must be stressed that this is only a trend and that no statistical significance may be attributed to these results ($F_{5,\ 106} = 1.012$, $p = .4144$), as there is a 41% chance that any decision based upon the statistics would be incorrect.

However, when comparing the Level of Highest Education with that of the users' reported Competency Level with regard to the field techniques, a definite relationship appeared. As illustrated in Table 4.9 and Table 4.10 it was statistically significant ($F_{5, 106} = 2.709$, $p = .0241$) that those respondents with a higher education had a larger mean score in relationship to Competency Level. Further, there was a statistically significant relationship between Level of Highest Education and Degree to Which Institution Teaches the techniques. As illustrated in Table 4.11 and Table 4.12 it was statistically significant ($F_{5, 106} = 5.378$, $p = .0002$) that the survey population members with a doctorate degree had a larger mean score than those with a bachelors and masters degree in relationship to the Degree to Which Institution Teaches; the relationship in the other three categories was not statistically significant.

Finally, it must be noted as well that there was no statistically significant relationship between the Level of Highest Education and the users' perceived Value (of the techniques) to Instructional Development, as there was a 12% chance that any decision based upon the statistics would be incorrect ($F_{5, 106} = 1.797$, $p = .1196$).

Hence, in conclusion to question 8, it must be decided that there was no significant relationship between the Graduate and/or Post Graduate Education (Level of Highest Education)...... although a trend did appear ... and the Level of Technique Use, as well as the Level of Highest Education and the Value to Instructional Development. There was, however, a significant relationship between the

Level of Highest Education and the respondents' Competency Level, as well as between the Level of Highest Education and the Degree to Which the Institution Teaches the Techniques.

TABLE 4.7

ANOVA BETWEEN LEVEL OF HIGHEST EDUCATION AND LEVEL OF USE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	5	4382.2704	876.4540	1.012	.4144
Within Groups	106	91802.9775	866.0658		
Total	111	96185.2344			

TABLE 4.8

ANOVA BETWEEN LEVEL OF USE AND LEVEL OF HIGHEST EDUCATION

MEAN SCORES (ORDERED)

GROUP	COUNT	MEAN	STANDARD DEVIATION	STANDARD ERROR
Ph.D/Ed.D	25	60.6000	28.3666	5.6733
M.A./M.ED./M.Sc.	51	59.8235	30.1102	4.2163
B.A./B.Ed./B.Sc.	19	53.3684	30.4872	6.9942
Specialist	10	45.0000	30.0924	9.5161
College/Certificate	5	41.2000	15.6429	6.9957
Others	2	37.5000	36.0624	25.5000

TABLE 4.9

ANOVA BETWEEN LEVEL OF HIGHEST EDUCATION AND COMPETENCY LEVEL

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	5	16964.4843	3392.8965	2.709	.0241
Within Groups	106	132751.5144	1252.3726		
Total	111	149715.9688			

TABLE 4.10

ANOVA BETWEEN LEVEL OF HIGHEST EDUCATION AND COMPETENCY LEVEL

MEAN SCORES (ORDERED)

GROUP	COUNT	MEAN	STANDARD DEVIATION	STANDARD ERROR
Ph.D./Ed.D.	25	89.1200	41.2020	8.2404
M.A./M.Ed./M.Sc.	51	84.5490	32.3816	4.5343
B.A./B.Ed./B.Sc.	19	67.5263	36.3140	8.3310
Specialist	10	63.6000	38.7877	12.2658
College/Certificate	5	48.8000	17.3118	7.7421
Others	2	37.5000	33.2340	23.5000

TABLE 4.11

ANOVA BETWEEN LEVEL OF HIGHEST EDUCATION AND DEGREE TO WHICH INSTITUTION TEACHES TECHNIQUES

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
Between Groups	5	19750.8079	3950.1611	5.378	.0002 *
Within Groups	106	77863.5674	734.5619		
Total	111	97614.3750			

* = Significant at .05 level

TABLE 4.12

ANOVA BETWEEN LEVEL OF HIGHEST EDUCATION AND DEGREE TO WHICH INSTITUTION TEACHES TECHNIQUES - MEAN SCORES (ORDERED)

GROUP	COUNT	MEAN	STANDARD DEVIATION	STANDARD ERROR
Ph.D./Ed.D.	25	42.1600	37.6239	7.5248
Others	2	30.0000	32.5269	23.0000
College/Certificate	5	23.8000	21.5685	9.6457
Specialist	10	14.8000	31.3964	9.9284
B.A./B.Ed./B.Sc.	19	13.0000	24.2579	5.5651
M.A./M.Ed./M.Sc.	51	8.9608	20.7402	2.9042

Question Nine: Are the four major categories of Competency Level, Level of Use, Value to Instructional Development, and Degree to Which Institution Teaches interrelated?

To address this question, a PEARSON CORRELATION was used to determine if there was any relation between various pairings of the four major response categories of each of the sixty techniques. In other words six (6) different correlations were computed for each of the techniques that appeared in the survey:

1.	Level of Competency	and	Level of Use
2.	Level of Competency	and	Value to Instructional Devel.
3.	Level of Competency	and	Degree Institution Teaches
4.	Level of Use	and	Value to Instructional Devel.
5.	Level of Use	and	Degree Institution Teaches
6.	Value to I.D.	and	Degree Institution Teaches

For each set of pairings, as may be found in Figure 4.2 (below), three values are stated. The top value refers to the correlation factor (r), the middle refers to the number of cases in the study, and the bottom is the p value or level of significance.

FIGURE 4.2

.3147	(Correlation)
(112)	(no. of cases)
s=.000	(significance)

All correlations were tested at the .05 level of significance. With the exception of Field Test (Level of Use and Degree Institution Teaches; Value to I.D. and Degree Institution Teaches), Multi-Image/Multi-Media Presentation (Level of Use and Degree Institution Teaches), and Story Boarding (Level of Use and Degree Institution Teaches), it may be concluded that a statistically significant relation was evident for each of the six pairings for all sixty techniques. As may be found in the example of APPRAISAL INTERVIEW (Table 4.13) and with most of the remaining 59 techniques (with the exception of the above noted four pairings) the correlations reveal definite relations as tested at the .05 level of significance. In fact, most p values were s = .000 signifying a perfect correlation. The outcome from the statistical treatment demonstrated a definite relation between the six above noted pairings and the following assertions may be made with regard to the survey population of this study:

1. The more competent the developers are with the techniques, the more valuable they perceive them to be to Instructional Development.
2. The more valuable the developers perceive the techniques to be to Instructional Development, the more competent the developers perceive themselves to be with the techniques.
3. The more competent the developers are with the techniques, the greater is the degree their

institution of employment teaches the techniques.

4. The greater the degree that the institutions of employment teaches the techniques, the more competent the developers perceive themselves to be with the techniques.
5. The more competent the developers are with the techniques, the more use they profess to make of the techniques.
6. The more use the developers profess to make of the techniques, the more competent they perceive themselves to be with the techniques.
7. The more use the developers profess to make of the techniques, the more value they perceive the techniques to be to Instructional Development.
8. The more value that the developers perceive the techniques to be to Instructional Development, the more use they profess to make of the techniques.
9. The more use the developers profess to make of the techniques, the greater is the degree their institution of employment teaches the techniques.
10. The greater the degree that the institutions of employment teaches the techniques, the more use the developers profess to make of the techniques.
11. The greater the degree that the institutions of employment teaches the techniques, the more valuable the developers perceive the techniques to be

to Instructional Development.

12. The more value that the developers perceive the techniques to be to Instructional Development, the greater is the degree their institution of employment teaches the techniques.

These assertions, based upon the outcomes from the statistical treatment of the data, will be addressed more concisely under the Conclusions section of Chapter V.

TABLE 4.13

PEARSON CORRELATION COEFFICIENTS

FOR

APPRAISAL INTERVIEW

	COMPETENCY	USE	VALUE	TEACH
COMPETENCY	1.0000 (112) S= .000	.8449 (112) S= .000	.7857 (112) S= .000	.3147 (112) S= .000
USE	.8449 (112) S= .000	1.0000 (112) S= .000	.7708 (112) S= .000	.3609 (112) S= .000
VALUE	.7857 (112) S= .000	.7708 (112) S= .000	1.0000 (112) S= .000	.3508 (112) S= .000
TEACH	.3147 (112) S= .000	.3609 (112) S= .000	.3508 (112) S= .000	1.0000 (112) S= .000

Question 10: Given a typical instructional development model, how well do the techniques being used by Canadian Instructional Developers match the required functions in the model?

In order to address this question, the study referred to the data generated in Question 1, wherein each of the techniques were ordered by mean scores as to their level of use (see Table 4.1). Selection of a technique for this question was based upon whether or not the mean score fell within the "HI" (3.00 - 2.26), "MEDIUM" (2.25 - 1.51), or "LO" (1.50 - 0.76) ranges; that is to say, the study was only concerned with those techniques which were currently being used by members of the survey population of Canadian developers. Any mean falling within the "NONE" range (0.75 - 0.00), disqualified the technique from consideration.

As a result of the above, a list of forty (40) techniques from Table 4.1 was sent to the members of the Field Experts who had validated this present study at the outset (Appendix D), along with a copy of Gentry's Management Framework Model (Appendix C). The experts were requested to match the techniques with appropriate functions or components of the model, using Figure 4.3 below as an example:

FIGURE 4.3

Brainstorming	C	DESIGN
	A	NEEDS ANALYSIS
	B	ADOPTION

The matching was performed on an appropriate form that was sent to the Field Experts (see Appendix K) along with a covering letter, and the results from this final survey were subsequently compiled.

If a model function or component was matched with a technique by more than one field expert, then such a match is reported in this study; if a match is reported by only a single expert, then it is treated as an isolated example and is not reported herein. For example, six (6) different field experts matched the technique BRAINSTORMING with model component "A" or NEEDS ANALYSIS; because more than one expert performed such a match, then such is reported in the following presentation. The results of this question are now documented in two forms: Table 4.14 illustrates the matching as listed by Field Technique, while Table 4.15 illustrates the matching as listed by Model Component.

TABLE 4.14

LISTING OF MANAGEMENT FRAMEWORK MODEL COMPONENTS BY TECHNIQUES

TECHNIQUE	MODEL COMPONENTS
Appraisal Interview	Needs Analysis Evaluation Communication Network Personnel Leadership
Authoritative Opinion	Needs Analysis Adoption Design Installation
Behavior Modelling	Design Personnel Leadership
Bloom's Taxonomy	Design Packaging Evaluation
Brainstorming	Needs Analysis Adoption Design Packaging Information Handling Leadership
Case Studies	Needs Analysis Design Packaging Evaluation
Checklists	Needs Analysis Design Operation Evaluation Information Handling Facilities

TABLE 4.14 (cont'd)

Computer Assisted Instruction	Needs Analysis Design Packaging Operation Evaluation Information Handling
Computer Search	Needs Analysis Design Information Handling Resource Acq. & Allocation
Content Analysis	Needs Analysis Design Evaluation Information Handling
Contract Plan	Adoption Design Packaging Installation Operation Evaluation
Cost-Benefit Analysis	Needs Analysis Packaging Installation Evaluation Resource Acq. & Allocation Facilities Leadership
Criterion Referenced Measurement	Needs Analysis Adoption Design Evaluation
Discovery Technique	Design Packaging Operation Personnel
Feedback	Design Packaging Installation Operation Evaluation Communication Network Information Handling Personnel Leadership

TABLE 4.14 (cont'd)

Field Test	Packaging Installation Evaluation Facilities
Flowcharting	Needs Analysis Design Evaluation Communication Network Resource Acq. & Allocation Facilities Leadership
Formative Evaluation	Design Packaging Evaluation
Gagne's Taxonomy	Design Evaluation Personnel
Interviewing Users	Needs Analysis Packaging Installation Operation Evaluation Information Handling
Learner Verification & Revision	Packaging Installation Operation Evaluation
Likert Scale	Design Operation Evaluation Resource Acq. & Allocation
Literature Search	Needs Analysis Design Communication Network
Long-Range Planning	Needs Analysis Adoption Design Installation Operation Evaluation Resource Acq. & Allocation Leadership

TABLE 4.14 (cont'd)

Management by Objectives	Needs Analysis Operation Evaluation Resource Acq. & Allocation Personnel Leadership
Micro Teaching	Design Packaging Operation Evaluation
Multi-Image/Multi-Media Present.	Design Packaging Facilities
Needs Assessment	Needs Analysis Evaluation
Program Evaluation Review Tech.	Needs Analysis Operation Evaluation Information Handling Resource Acq. & Allocation Leadership
Programmed Instruction	Design Packaging
Program Planning Budget. System	Needs Analysis Evaluation Resource Acq. & Allocation
Questionnaire	Needs Analysis Design Evaluation Information Handling
Role Playing	Design Packaging Personnel Leadership
Sequencing of Objectives	Needs Analysis Design
Simulation	Design Packaging Evaluation

TABLE 4.14 (cont'd)

Standardized Tests	Needs Analysis Operation Evaluation
Story Boarding	Design Packaging Information Handling
Summative Evaluation	Operation Evaluation
Task Analysis	Needs Analysis Adoption Design Evaluation
Technical Conference	Needs Analysis Adoption Design Packaging Evaluation

TABLE 4.15

LISTING OF TECHNIQUES

BY MANAGEMENT FRAMEWORK MODEL COMPONENTS

MODEL COMPONENTS	TECHNIQUES
Needs Analysis	Appraisal Interview, Authoritative Opinion, Brainstorming, Case Studies, Checklists, Computer Assisted Instruction, Computer Search, Content Analysis, Cost-Benefit Analysis, Criterion Referenced Measurement, Flowcharting, Literature Search, Long-Range Planning, Management by Objectives, Needs Assessment, Program Evaluation Review Technique, Program Planning Budgeting System, Questionnaire, Sequencing of Objectives, Standardized Tests, Task Analysis, Technical Conference
Adoption	Authoritative Opinion, Behavior Modelling, Brainstorming, Contract Plan, Criterion Referenced Measurement, Long-Range Planning, Task Analysis, Technical Conference
Design	Authoritative Opinion, Bloom's Taxonomy, Brainstorming, Case Studies, Checklists, Computer Assisted Instruction, Computer Search, Content Analysis, Contract Plan, Criterion Referenced Measurement, Feedback, Flowcharting, Formative Evaluation, Gagne's Taxonomy, Likert Scale, Literature Search, Long-Range Planning, Micro Teaching, Multi-Image/Multi-Media Presentation, Programmed Instruction, Questionnaire, Role Playing, Sequencing of Objectives, Simulation, Story Boarding, Task Analysis, Technical Conference

TABLE 4.15 (cont'd)

Packaging	Bloom's Taxonomy, Brainstorming, Case Studies, Computer Assisted Instruction, Contract Plan, Cost-Benefit Analysis, Discovery Technique, Feedback, Field Test, Formative Evaluation, Interviewing Users, Learner Verification and Revision, Micro Teaching, Multi-Image/Multi-Media Presentation, Programmed Instruction, Technical Conference
Installation	Authoritative Opinion, Contract Plan, Cost-Benefit Analysis, Feedback, Field Test, Interviewing Users, Learner Verification & Revision, Long-Range Planning
Operation	Checklists, Computer Instruction, Contract Plan, Discovery Technique, Feedback, Interviewing Users, Learner Verification & Revision, Likert Scale, Long-Range Planning, Management by Objectives, Micro Teaching, Program Evaluation Review Technique, Standardized Tests, Summative Evaluation
Evaluation	Appraisal Interview, Bloom's Taxonomy, Case Studies, Checklists, Computer Assisted Instruction, Content Analysis, Contract Plan, Criterion Referenced Measurement, Feedback, Field Test, Flowcharting, Formative Evaluation, Gagne's Taxonomy, Interviewing Users, Likert Scale, Long-Range Planning, Management by Objectives, Micro Teaching, Program Planning Budgeting System, Questionnaire, Simulation, Standardized Tests, Summative Evaluation, Task Analysis, Technical Conference
Communication Network	Appraisal Interview, Feedback, Flowcharting

TABLE 4.15 (cont'd)

Information Handling	Brainstorming, Checklists, Computer Assisted Instruction, Computer Search, Content Analysis, Feedback, Interviewing Users, Literature Search, Program Evaluation Review Technique, Questionnaire, Story Boarding
Resource Acquisition and Allocation	Computer Search, Cost-Benefit Analysis, Flowcharting, Likert Scale, Long-Range Planning, Management by Objectives, Program Evaluation Review Technique, Program Planning Budgeting System
Personnel	Appraisal Interview, Behavior Modelling, Discovery Technique, Feedback, Gagne's Taxonomy, Management by Objectives, Role Playing
Facilities	Checklists, Cost-Benefit Analysis, Flowcharting, Multi-Image/Multi-Media Presentation
Leadership	Appraisal Interview, Behavior Modelling, Brainstorming, Cost-Benefit Analysis, Feedback, Flowcharting, Management by Objectives, Program Evaluation Review Technique, Role Playing

In the foregoing chapter, each of the ten major questions addressed by this study was considered in order and an analysis of the data generated by the study for each question was presented. Further, the analysis of each question was accompanied by supporting tables of information. Conclusions based upon the above analysis and support material, as well as recommendations for future research will be presented in the next chapter of this work.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

The research found herein attempted to identify which field techniques are currently being used by Canadian instructional developers and to what extent they are being employed. Chapter I commenced with a statement of the problem at hand, as well as a discussion on the need for and the originality of the study; it further provided a listing of the basic assumptions and limitations of the study, as well as a set of definitions of the major terms used in the work.

In order to provide a backdrop for the study, Chapter II illustrated the relevance and importance of techniques to the field of Instructional Development by presenting an historical perspective of how educational change may be brought about by technology. The field of Instructional Development was discussed as one means toward a technological, systematic approach to change. Therein various components of an ID model may be operationalized through a variety of field techniques. In addition,the relevance of the hybrid principle, (ie. the usage of techniques from other disciplines), was discussed. The chapter concluded by citing Gentry's 1980-81 study and how it would serve as a prototype for the present investigations.

Each of the ten questions addressed by the study was outlined in Chapter III, which was followed by a discussion of the research population, the survey sample, and the sampling procedures. The composition of the survey instrument and an investigation of the data collection procedures were also presented. In conclusion, Chapter III proceeded with the analysis and interpretation procedures of the raw data. In Chapter IV, the study presented an analysis of the data generated by the research for each of the ten questions under consideration. The analysis was accompanied by supporting tables of information.

In this Chapter a series of conclusions are present as well as recommendations for further studies based upon the findings presented in the previous chapter. Some implications for the future are offered, based upon the above mentioned findings, as well as upon associated, relevant caveats found within the literature. The work concludes with a brief summary and a final statement.

SUMMARY OF FINDINGS

Before considering the conclusions that may be drawn from the study, it is first necessary to briefly summarize the findings of the research as they pertain to each of the major questions addressed by the work. In order of presentation, the findings were as follows:

1. Of the sixty techniques in the study, only nine (15.0%) were considered to be the major ones being used by the survey population of Canadian instructional developers: FEEDBACK, BRAINSTORMING, FIELD TEST, NEEDS ASSESSMENT, LONG-RANGE PLANNING, MULTI-IMAGE/MULTI-MEDIA PRESENTATION, QUESTIONNAIRE, LITERATURE SEARCH, and FLOWCHARTING.

2. Of the sixty techniques in the study, the survey population of Canadian instructional developers felt competent with the use of twenty-eight. (46.7%) These techniques are ranked from 1 through 28 in Table 4.2 .

3. Of the sixty techniques in the study, the survey population of Canadian instructional developers felt that only twenty (33.3%) of them were relevant or valuable to the field of Instructional Development. These may be found numbered 1 through 20 in Table 4.3 .

4. Of the sixty techniques in the study, it was determined that fourteen (23.3%) techniques were unfamiliar to the survey population of Canadian instructional developers. These are numbered 47 through 60 in Table 4.2 . Conversely, it was determined that 46 (76.7%) of the techniques were familiar to the survey population.

5. It was determined that <u>none</u> of the techniques are being taught to a significant degree in a formal manner at the institutions employing the members of the survey population.

6. With the exception of five (5) techniques, as noted on page 63 of Chapter IV, it was determined that there is no relationship between the number of years of teaching experience and the use of techniques. (Of the five techniques where a statistically significant relationship existed, none of them were deemed to be valuable to the field by members of the survey population.)

7. Although a trend appeared, there was no statistically significant evidence to prove that the respective employment areas of the survey population are related to the level of technique use.

8.a. Although a trend appeared, there was no statistically significant relationship between graduate and/or post graduate education and the level of technique use.

b. There was no significant relationship between the graduate and/or post graduate education and the perceived value of the techniques to Instructional Development by the survey population.

c. There was a significant relationship between the graduate and/or post graduate education and the survey population's perceived competency levels of the techniques.

d. There was a significant relationship between the graduate and/or post graduate education and the degree to which the institutions employing the survey population teach the techniques.

9. It was determined that a strong relationship existed among the four major categories of Competency Level, Level of Use, Value to ID, and Degree to Which Institution Teaches the Techniques.

a. The greater degree that graduate and/or post graduate institutions teach field techniques, the more familiar and competent the student developers will be with them, the more valuable they will perceive the techniques to be, and the more use they will make of them in the field after graduation.

b. The more competent that the developers are with the field techniques, the more valuable they will perceive them to be and the more use they will make of them in the field.

c. The more use that the developers make of field techniques, the more competent they will become with them and the more valuable they will perceive them to be to the field of Instructional Development.

d. The more valuable developers perceive field techniques to be to Instructional Development, the more use they will make of them, and the more competent they will become with them.

10. Following a survey of experts in the field of Instructional Development in both Canada and the United States, it was determined that the forty (40) techniques, presently being used by the survey population of Canadian instructional developers, match quite significantly with the various components or functions of a recognized ID systems model. The results of such matching may be found in Table 4.14 and Table 4.15 .

CONCLUSIONS

The following conclusions are drawn from the findings of the study. These conclusions are pertinent to and limited by the assumptions and the design of the study.

1. Because of the very low number of field techniques being used and the very low number of techniques being taught by the members of the survey population, it may be concluded that very few Canadian institutions are teaching instructional development techniques at the graduate and/or post graduate levels.

2. Because a relatively low percentage of field techniques are perceived to be valuable and very few techniques are being used, it may be concluded that very few Canadian institutions are teaching instructional development techniques at the graduate and/or post graduate levels.

3. Because there is a high familiarity level of field techniques but a very low significance level of techniques being taught by members of the survey population, it may be concluded that Canadian Instructional Developers are receiving their information about field techniques through formal training outside of Canada, or through their professional readings.

4. Because the survey population was familiar with a large number of the field techniques, of which they determined few were used and many were of low value, it may be concluded that there may be a number of techniques being used which were not listed on the survey sample.

5. If it may be concluded that there are a number of techniques which were not on the survey sample and as only two additional techniques (3%) were suggested by the field experts (only one from the sixteen Canadian experts), it may be concluded that other field experts exist who are familiar with additional field techniques that were not included on the survey instrument.

6. Because the survey population was familiar with a large number of the field techniques, of which they determined few were used and many were of low value, it may be concluded that there are a significant number of AMTEC members who are familiar with instructional development

techniques but who are not actually practising instructional development activities in their professional work. In other words, a developer may know <u>about</u> a technique, but due to job orientation, s/he may not be able to develop skills with it from lack of use.

7. To the extent that the survey population was familiar with 76.7% of the techniques, competent with 46.7% of the techniques, valued 33.3% of the techniques, and used 15% of the techniques, it may be concluded that there is a progression of responses from familiarity, to competency, to perceived value, to usage of the field techniques. Given such, it may be concluded that the more techniques a developer is familiar with, the more s/he will be competent with, in turn the more s/he will perceive as being valuable, and subsequently the more s/he will use in instructional development activities.

8. Because of the successful matching of the survey techniques to the ID system model components, it may be concluded that recognized field experts are ideal developers to solicite future matchings with regard to other techniques not used in the present study.

<u>RECOMMENDATIONS FOR FURTHER RESEARCH</u>

The following recommendations are drawn from the findings of this study. The recommendations are pertinent to and limited by the assumptions, findings, and design of the study.

1. A follow-up survey could be conducted involving the <u>entire</u> membership of AMTEC in order to,

   a. ascertain which field techniques are currently being used and to discover how such a list would compare to those techniques used in this present study.

   b. differentiate between members who are <u>practicing</u> instructional developers and those who are not.

   c. match the utilization levels of the field techniques with roles or job responsibilities, with Levels of Education, and with the number of years of teaching experience.

To insure a significant response level, the survey could be taken at the annual convention in June, with a mailing to those members who didn't register.

2. Further research could be conducted to survey all graduate and post graduate institutions in Canada, in order to ascertain which techniques are currently being taught and to discover how such a list would compare to those techniques used in this present study.

3. A survey similar to the present study could be conducted involving the entire membership of the Division of Instructional Development, within the AECT organization in the United States.

4. Further research could be conducted in other fields in order to collect additional techniques relevant to Instructional Development, and thus implement the hybrid principle.

5. Future research and publications could investigate and report those techniques which are relevant to the separate studies of Instructional Development, Faculty Development, and Organizational Development, in an attempt to exemplify and promote the emerging field of Educational Systems Development.

6. Future survey instruments which are published in educational journals could be,

   a. printed in the centre of the journal and/or perforated for easy detachment.

   b. appear in an issue that does not immediately precede a summer recess period, which is assumed to inhibit the response level.

IMPLICATIONS

The research findings of this study have direct implications for the field of Instructional Development in general and Canadian instructional developers in particular.

The following discussion and statements presented are not necessarily supported by the findings of the study, but are considered pertinent for program implementation, program changes, and future state-of-the-art directions.

1. Wherever Canadian educational institutions are not providing ID programs, instructional developers could urge their faculties to provide such.

Although this present study has recommended the provision for Instructional Development programs in Canadian educational institutions, such may not occur without the active, influence of practising instructional developers. Inducement may take the form of effective and efficient field practices, which will be dealt with more completely in the following implication. However, the major task for developers with regard to this implication is the raising of the awareness levels of those individuals in positions of authority. Administrators could be influenced by developers as to the benefits of ID practices. Braden and Terrell (1978:229) urge ID practitioners to actively promote their profession. Bass, Lumsden, and Dills (1978:243) agree, suggesting that "we can no longer afford to wait idly until the world beats a path to our doors for help." Specifically in the Canadian educational arena, Powell (1979:23) suggests that Canadian standards should be advanced and Canadian interests pursued in the field of Educational Technology; Schwier and Wickett (1981:23) maintain that "ID training will assist in the implementation of new styles of program delivery and it will help practitioners adopt new roles and functions". These beliefs must be effectively and consistently presented to university administrators wherein ID programs do not exist.

2. Canadian instructional developers could strive to inform the educational community in general and the elementary and secondary panels in particular of the potential benefits of Instructional Development activities.

In continuation of the "awareness campaign" discussed above, instructional developers could be prepared to diffuse information concerning the potential benefits of ID activities throughout the entire spectrum of education. Gustafson (1977:29) already has admonished the profession to instruct the whole educational community concerning Instructional Development's potential, and others have warned the field not to ignore the elementary and secondary levels (Braden & Terrell, 1978:229; Bass, Lumsden, & Dills, 1978:239-240). The latter point is quite relevant to our earlier considerations, in that a thriving display of ID successes at the grass roots level may provide impetus for the creation of ID programs in Canadian educational institutions. Duke (1981:6) offers a set of convincing arguments for the expansion of ID activities within the public school system. One such argument is the presentation of compelling evidence of cost-effectiveness. Particularly in an era of financial restraints, the promise of cost-effectiveness should be welcomed by most administrators and ID may subsequently secure a foothold in the elementary panel as a result (Wilkinson, 1978:171-200; Lent, 1979:26-32; Klein & Doughty, 1980:19-24).

3. Canadian instructional developers should be prepared to combat the prevailing belief that instructional developers and such interfacing professionals as librarians and media specialists are expendable in an era of financial restraints.

In times of budget cuts and financial restraints, areas associated with instructional developers are often considered to be luxuries and hence expendable (Bratton, 1978:148; Bennett, 1980:6). Silby (1980:13) observes that the "impression that screen education is concerned with trivia still has enormous currency", and Pipes (1981: 15) suggests that school media specialists are easy targets for staff cuts; Cooper (1980:5) makes a similar assertion with regard to library personnel. Regardless of the value and worthwhile nature of these programs, many services have been crippled due to government funding cuts (Lee, 1981:17). This is a major problem that must be addressed by developers. Governments must be urged to provide funding for entire processes of instructional design and implementation, rather than just seed money for <u>establishing</u> new programs without concern for continuation. Developers must be prepared to prove that instructional development is not a passing fashion, but rather a viable force for preventing and solving instructional problems (Davis, 1978:6). One method of insuring this recognition is to institutionalize the field of Instructional Development in Canada; examples will be presented in the following two implications.

4. A Credentials Committee could be formed in Canada in order to define and certify practicing instructional developers.

In order to attain the level of recognition that Canadian instructional developers need, as discussed above, they must be prepared to formulate a committee whose job it will be to identify the competencies, methodologies, and tasks of the profession. Bass, Lumsden, and Dills (1978:234) have noted a similar organization in the United States, while pertinent discussions on instructional development competencies may be found within the works of Bratton (1980:2-8), Silber (1981:33-40), and the Task Force on ID Certification (1981:14-15). The creation of a Credentials Committee in Canada could be executed by the Instructional Development Special Interest Group, which has been founded within the AMTEC organization.

5. A communications network could be formed between and among Canadian Instructional Developers.

One of the prime objectives of the Division of Instructional Development (DID) is the facilitation of communication among instructional developers, both on a person-to-person basis and through written communication (Bass, Lumsden, & Dills, 1978:233). This concept not only serves to share ideas and practices, but to institutionalize the profession, one of the requisites for attaining the needed recognition that has been discussed above. A special interest group of Instructional Developers has been formed within the AMTEC organization

(Marzotto, 1979:14; Schwier, 1980:16). It would naturally follow that such a group could formally codify its aims and objectives, identify and define its competencies, and thence certify its members. A publication along the lines of the Journal of Instructional Development and/or a regular news letter would then tend to cement its membership by opening a communications network among those Canadian professionals who are practising instructional development activities.

The foregoing chapter has presented a summary of findings of this present study. From those findings, a set of conclusions were drawn concerning the state-of-the-art of Instructional Development in Canada. From these conclusions were presented seven (7) recommendations for further research and study in the field of ID, with an emphasis on the Canadian educational arena. The chapter concluded with a presentation of five (5) implications for the future of ID in Canada, with support from the findings of this present study as well as a number of relevant caveats found within the literature.

In conclusion, it must be noted that Instructional Development in general and field techniques in particular could play a major role in the present and future directions of education in Canada. However, developers must be prepared to assert their professionalism, both in terms of who they are as well as what they can do, in order to assure their due recognition and worth, particularly in times of financial restrictions.

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APPENDICES

APPENDIX A

Original List of Techniques

Alexander's Method for Determining Components

Analysis of Interconnected Decision Areas (AIDA)

Authoritative Opinion

Appraisal Interview

Behavior Modelling

Behaviorally Anchored Rating Scale

Bloom's Taxonomy

Brainstorming

Broken Squares

Card Sort

Case Studies

Check Lists

Cognitive Mapping

Compressed Speech

Computer Assisted Instruction

Computer Search

Content Analysis

Contextual Mapping

Contingency Management

Contract Plan

Cost Benefit Analysis

Criterion Referenced Measure.

Critical Incidents Technique

Critical Path Method(CPM)

Dale's Cone

Decision Tables

Delphi Technique

Discovery Technique

Discrepancy Evaluation

Distance Teaching & Learning

Dynamic Programming

Ethnography

Fault Tree Analysis

Feedback

Field Test

FIRO - B

Flowcharting

Force-Field Analysis

Formative Evaluation

Function Analysis

Futures Wheel

Gagne's Taxonomy

Galileo System

Gaming

Gannt Chart

Immediate Feedback

Original List of Techniques (continued)

In-Basket Technique

Information Mapping

Interaction Matrix

Interaction Net

Interactive Television

Interface Analysis

Interpersonal Recall (IPR)

Involvement Matrix

Interviewing Users

Johnson-Neyman Technique

Krathwohl's Taxonomy

Latent Image

Learner Verification & Revision

Least-Preferred Coworker

Likert Scale

Linear Programming

Literature Search

Log Diary

Long-Range Planning

Management by Objectives (MBO)

Managerial Grid

Mathetics

Matrix Sampling

Merit Rating Chart

Micro Teaching

Monte Carlo Method of Analysis

Morphological Charts

Multidimensional Scaling

Multi-Image/Multi-Media Presentation

Network Analysis

Needs Assessment

Nominal Group Process

Observation Interview

Organization Chart

Pair-Associate Learning

Participative Management

Path Analysis

Personal Inverted Filing System

Program Evaluation Review Technique

Program Planning Budgeting System (PPBS)

Questionnaire

Q-Sort

Relational Control Analysis

Relevance Trees

Role Playing

Semantic Differential

Original List of Techniques (continued)

Sensitivity Training

Sequencing of Objectives

Shaping

Simulation

Stake Model

Standardized Tests

Story Boarding

Summative Evaluation

Synectics

Systemic Testing

System Transformation

Task Analysis

Technical Conference

Telelecture

Trialogue

Visual Inconsistencies

APPENDIX B

Supportive Canadian Instructional Developers
(Phone Survey: August, 1979)

1. Garfield Fizzard,
Director,
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2. Sally N. Landerkin,
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3. David MacDougall,
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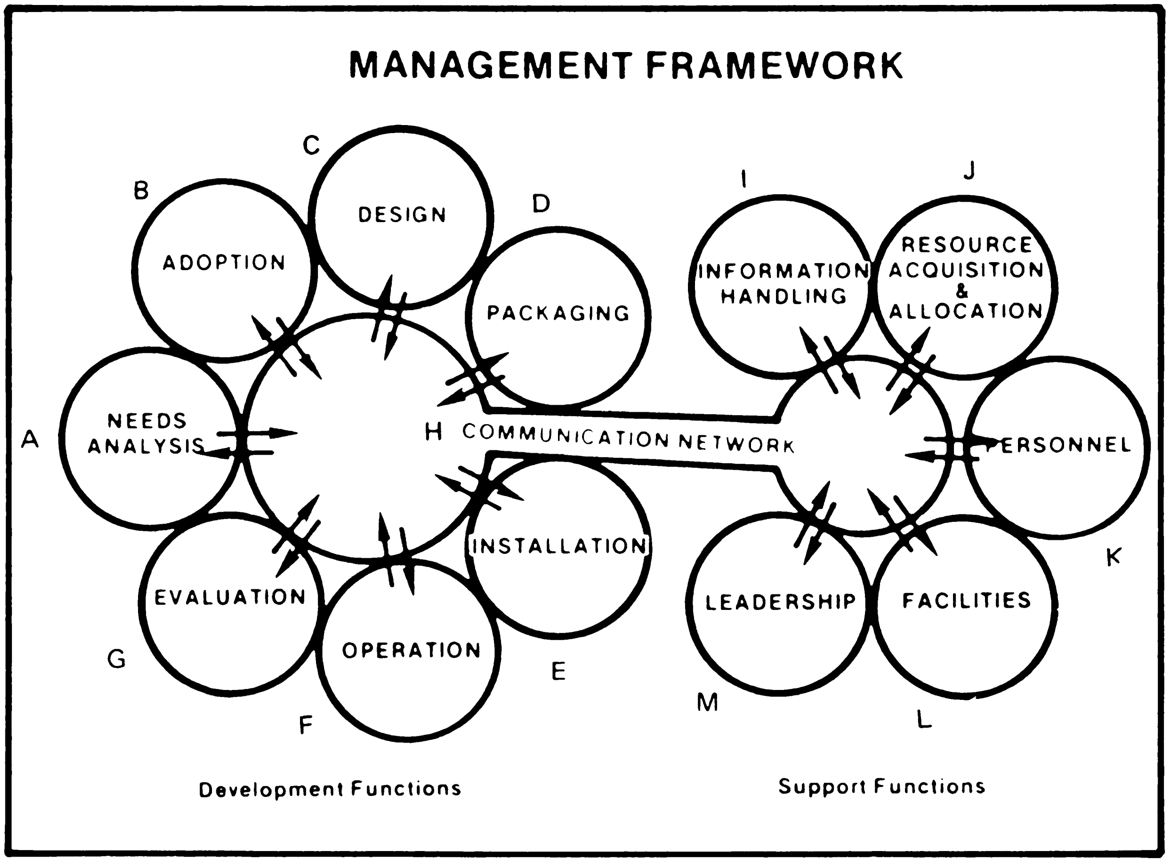
APPENDIX C

GENTRY'S

MANAGEMENT FRAMEWORK MODEL[1]



Function Descriptions

A. Needs Analysis - The process for determining changes required in a training program, based on evaluation data.

1. Identify problems
2. Identify symptoms
3. State problem(s)
4. State problem as need(s)
5. Assess needs
6. Establish priorities
7. State needs as goals

Gentry's Management Framework Model[1] (continued)

B. Adoption - The process of obtaining agreement and support from legitimizers, decision-makers, and gatekeepers to incorporate an innovation into a training program.

1. Identify influentials
2. Determine stage of adoption
3. Identify adoption strategy
4. Establish resource base
5. Gain acceptance of goals by influential (commitment of resources)

C. Design - The process of analyzing, planning, and drawing up appropriate training strategies to accomplish a proposed change.

1. Determine audience characteristics
2. Determine instructional competencies and objectives.
3. Sequence objectives
4. Determine necessary learning conditions
5. Determine system constraints and options
6. Determine alternative instructional strategies
7. Select most appropriate instructional strategy
8. Select most appropriate media

D. Packaging - The process of developing, acquiring, and assembling the necessary skills, facilities, materials, and equipment for the prototype change.

1. Reconcile design specifications
2. Make production decisions
3. Produce instructional components
4. Assemble instructional components
5. Tryout prototype (field test)
6. Revise prototype

E. Installation - The process of initially incorporating the training change into the program.

1. Determine interface effects
2. Correct for undesirable effects
3. Connect up with suprasystem (policy change, form recognition, etc.)
4. Reduce number of dislocations

Gentry's Management Framework Model[1] (continued)

F. Operation - The process responsible for maintaining the training change on a continuing basis.

1. Make "on-going" maintenance decision
2. Maintain system evaluation procedures

G. Evaluation - The process of collecting data and providing confirming and corrective feedback on the relevancy, effectiveness, and efficiency of the training program elements.

1. Determine evaluation model to be used
2. Identify criteria for evaluating instructional components in terms of effectiveness, efficiency, and relevancy
3. Identify existing or develop evaluation instruments
4. Establish rules for acting on evaluation data (Revision decisions)

H. Communication Network - The formal and informal procedures by which essential program information gets from the generator of the information to the user of the information.

1. Determine communicants
2. Select communication modes
3. distribute information

I. Information Handling - The procedures for selecting, collecting, processing, transmitting, storing, retrieving, and assessing information.

1. Selection of essential information
2. Collection of essential information
3. Organization of essential information
4. Storage of information
5. Retrieval of information

J. Resource Acquisition and Allocation - The procedures for communicating training program resource requirements, acquiring the resources, and distributing them among the elements of the program.

1. Identify resource needs

Gentry's Management Framework Model[1] (continued)

2. Identify source of resources
3. Choose appropriate budgeting model
4. Develop budget
5. Timing of allocation
6. Re-allocation decisions

K. Personnel - This function prescribes personnel responsibilities, and provides for handling internal personnel matters such as inservice training, and discipline.

1. Identification of skills required
2. Hiring and firing
3. Training of personnel
4. Reward system

L. Facilities - The processes for organizing and controlling spaces that serve the purposes of a training program.

1. Determine criteria for selecting or modifying instructional spaces
2. Project facility needs

M. Leadership - The processes by which policies are determined, adopted, and enforced, and the process of coordinating and controlling the elements of the program, so as to efficiently attain goals.

1. Specify tasks
2. Assign responsibilities
3. Coordination and control of instructional components and personnel
4. Interface with supra and related systems
5. Develop timelines

1 - Gentry, C.G., "A Management Framework for Program Development Techniques", Journal of Instructional Development, 4:2, pp. 33-7.

APPENDIX D

Panel of Field Experts

(Addresses as per original mailings:
October - December, 1979)

* = Did Not Validate and Return Survey Instruments.

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32605.

Henry A. Bern,
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47401.

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T6E 2G5.

D. Carl,
Director,
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A1B 5B8.

P. R. Christensen,
Head, Learning Resource
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K6H 4Z1.

Ellen Curtis,
Instructional Designer,
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* Colin Davies,
Dir. of Learning Resources,
Faculty of Education,
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Newfoundland,
St. John's, Nfld.
A1B 3X8.

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Centre for Instructional
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13210.

Joseph Durzo,
Centre for Instructional
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13210.

Ken Everest,
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Waterloo, Ontario.
N2L 2P9.

Panel of Field Experts (continued)

* Garfield Fizzard,
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A1B 3X8.

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Dean Education,
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U.S. International University,
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92131.

Robert Heinich,
Chairman,
Department of Instructional Systems Technology,
Indiana University,
Bloomington, Indiana,
47405.

W. P. Hillgartner,
Director,
Instructional Communications Centre,
McGill University,
4696 Westmount Ave.,
Westmount, Quebec.

Sally Landerkin,
Project Co-ordinator,
Higher & Further Education,
Alberta Educational Communications Corp.,
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Calgary, Alberta.
T2N 4J8.

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Ottawa, Ontario.
K1S 5B6.

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San Diego, California,
92111.

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Oakville, Ontario.
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Michael Molenda,
Audio-Visual Center,
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47401.

Neil Nelson,
3269 Homark Dr.,
Mississauga, Ontario.
L4Y 2K5.

* D. W. Poole,
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Olds College,
Olds, Alberta.
TOM 1PO.

Fred B. Rainsberry,
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Ontario Institute for Studies in Education,
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Toronto, Ontario.

Panel of Field Experts (continued)

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22003.

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* Ian C. Wilson,
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East Lansing Michigan.
48824.

APPENDIX E

Request Letter to Field Experts

Mr. T. L. Bennett,
R.R. #3,
Parry Sound, Ontario.
P2A 2W9.

December 11, 1979.

Dr. W. P. Hillgartner,
Director,
Instructional Communications Centre,
McGill University,
815 Sherbrooke St. West,
Montreal, Quebec.
H3A 2K6

Dear Dr. Hillgartner:

I am presently preparing to commence work on a doctoral dissertation in Instructional Development and Technology at Mighigan State University.

The thrust of the study is to identify major field techniques and utilization levels of Canadian instructional developers. Before sending out my survey instrument, I would like to have it validated by a panel of field experts. Hence, my purpose in writing you.

Would you be kind enough to serve on such a panel? Your sole task would be to receive a copy of my survey instrument and make any suggestions for its improvement, if you deem that such are necessary.

A reply at your earliest convenience would be greatly appreciated.

Yours truly,

Thomas Bennett

T.L. Bennett

For your convenience please check below and return this letter to me.

Yes ______ No ______

APPENDIX F

Field Experts' Validation Package

Mr. T. L. Bennett,
R.R. #3,
Parry Sound, Ontario.
P2A 2W9.

June 1980.

Dear

Once again may I thank you for consenting to act as a Field Expert to validate the survey instrument that I will be sending to my survey population in order to complete my Ph.D. Dissertation:

"A Study to Identify Major Field Techniques and Utilization Levels by Canadian Instructional Developers."

Included in this present package is the following:

1. Questionnaire Survey: TECHNIQUE RESPONSE FORM
2. List of Technique Definitions
3. Technique Rating Instrument (yellow sheet)
4. Form for Additional Techniques (blue sheet)
5. Form for suggestions and comments to be made by Field Experts (pink sheet).

The proposed study is a Descriptive Research Dissertation designed to investigate knowledge and application levels of major Instructional Development techniques as well as to identify educational change agents and Instructional Developers who apply such techniques. The researcher will attempt to identify <u>which</u> techniques are presently employed in the field, as well as to what <u>extent</u> they are being used by Instructional Developers in Canada. The population to be surveyed is developers who are members of the <u>Association for Media and Technology in Education in Canada</u> (AMTEC).

Field Experts' Validation Package (continued)

On completion of the study, the researcher hopes to be able to recommend which recognized field techniques are being presently used to a significant extent by Canadian developers, and hence which ones should be concentrated upon in teacher training institutions and those of higher education. Further, these techniques will be correlated, at a later date, with appropriate functions in a generalizable systems approach model, such as a modified Instructional Development Institute Model.

Specifically, the study will address the following questions:

1. What are the major techniques (from an expert validated list) being employed by Canadian Instructional Developers in the field?

2. What is the developer's perceived level of competency with each technique?

3. What is the perceived value or relevancy of each technique, as viewed by the developers?

4. How many of these techniques are <u>unfamiliar</u> to the developers?

5. Which of these techniques are currently being taught by Instructional Development programs and teacher education programs in Canadian graduate and undergraduate institutions of learning?

6. Are the respective positions of the surveyed developers related to the level of technique use?

7. Are the respective employment areas of the surveyed developers related to the level of technique use?

8. Is the graduate and/or post-graduate education of the developers related to the level of technique use?

9. Given a typical instructional development model, how well do the perceived major techniques match with the required functions in the model? (to be addressed at a later date, following the present, proposed survey).

****

As a Field Expert, the researcher hopes that you will be able to rate <u>each</u> technique in terms of its value in

the field. For this purpose, you have been supplied with a form entitled TECHNIQUE RATING INSTRUMENT. This form contains the 108 "techniques" that the researcher has generated. It must be noted that this list will not necessarily become the final one which will be sent to the survey population. That decision will be left to the descretion of the Field Experts.

To be more precise, the final list of techniques will be determined by the results of the TECHNIQUE RATING INSTRUMENT. As a Field Expert, you are being asked to rate each "technique" in terms of the following criteria:

1. Is the "technique" in question, actually a technique? Is it a technique or is it something else, such as a "tactic" or a "technology"?

2. How "powerful" or "valuable" is the technique in terms of the Instructional Development arena?

Each technique will be rated by you on a five-point scale (4=Extremely Valuable; 0=Little or no Value or Not a Technique). Those techniques receiving an over-all average of 2(two) or more as determined by the Field Experts will be included in the final list that will be sent to the survey population. As well you may include suggestions for techniques that have not been included in the researcher's original list; such may be placed on FORM FOR ADDITIONAL TECHNIQUES.

Further, the researcher recognizes that many of the techniques included in his list may be labelled by the Field Experts by another name. If such is apparent, in your case, please include the name with which you are more familiar on the TECHNIQUE RATING INSTRUMENT following the five-point rating scale.

With regard to the consideration of whether the "technique" in question is actually a technique, please be guided by the following criteria:

TECHNIQUE - Technique refers to any complex of standardized means for attaining a predetermined result.

1. The technique should be specific with well-defined characteristics and processes.

Field Experts' Validation Package (continued)

2. The technique should be relevant to the specific function(s) specified for the targeted instructional development systems model.

3. The technique should be applicable to the specific problems that are to be solved (i.e. applicable at strategical or policy decision level, and/or operational level).

4. The technique, in order to be operational for an instructional developer, should not (for the most part) exceed the constraints of the system in which it must operate:

   (a) time available
   (b) skills available
   (c) resources available
   (d) client attitudes
   (e) physical limitations

Hence, the above noted criteria should be satisfied before the term under consideration may be deemed a "technique" and therefore eligible for inclusion in the survey.

The researcher already recognizes that some of the terms included do not satisfy these needs, and are better classified as some of the following:

TACTIC - much broader in scope than a technique; any effort that may be made as a day-to-day decision; something which is characterized by trial-and-error.

STRATEGY - super-system which includes a "technique" as a sub-set; much broader in scope; an over-all approach to instruction that is incorporated in the over-all instructional system or instructional product.

TECHNOLOGY - a complex, integrated organization of men and machines, of ideas, of procedures, and of management; includes strategies, processes, systems, management and control mechanisms.

In summary, any term included in the researcher's list of 108 terms which for the most part <u>can't</u> satisfy the criteria for technique (those which are more appropriately tactics, strategies, or technologies), should receive a <u>zero</u> (0) rating on the TECHNIQUE RATING INSTRUMENT.

Field Experts' Validation Package (continued)

Finally, the researcher respectfully asks you to consider the questionnaire survey, Technique Response Form, which will be sent to the entire survey population. Any suggestions that you can offer with regard to this instrument, will be greatly appreciated.

May I take this opportunity to apologize for the length of this covering letter, and beg your indulgence in completing the tasks that it sets out for you. Please don't hesitate to get in touch with me in writing or by phone (I'll accept any charges) if I can be of further help in clarifying any of the above.

Thank you once again for your most valuable support. I remain,

Respectfully yours,

Thomas

T.L. Bennett
Site 3, R.R. #3,
Parry Sound, Ontario.
P2A 2W9.

Phone: 705-746-9213 (home)

Field Experts' Validation Package (continued)

SURVEY OF FIELD TECHNIQUES UTILIZED BY CANADIAN INSTRUCTIONAL DEVELOPERS

Anonymity & Confidentiality:

All information you furnish will be held in strict confidence and reported in statistical aggregates only. No data which will link an individual to specific or general responses will be reported.

Directions:

> Filling out the questionnaire will require approximately thirty minutes of your time. Most questions can be answered simply by checking the appropriate box. In a few instances you will be requested to make brief written responses.
> Please answer all questions whenever possible.
> Thank you.

If you have any questions about this survey of Field Techniques, please feel free to write to:

Mr. Thomas Bennett,
Site 3, R.R. #3,
Parry Sound, Ontario. P2A 2W9.

1. Respondent's Name (for tabulation purposes only)

    ____

2. Years of teaching or educational work experience ______

3. Level of highest education (check one)

    _____ B.A. / B.Ed. / B.Sc.

    _____ Specialist or equivalent

    _____ M.A. / M.Ed. / M.Sc.

    _____ Other (Specify) ______________________

    _____ PhD. / Ed.D.

    _____ College Diploma or Certificate (Specify diploma, institution, and Program description)

    ____

Field Experts' Validation Package (continued)

4. Name of University or College of your highest degree

____

5. Name of the program of your highest degree if you graduated with one of the degrees in No. 3 above (check one).

_____ Adult Education

_____ Applied Psychology

_____ Computer Applications

_____ Curriculum

_____ Educational Administration and/or Planning

_____ Higher Education

_____ History and/or Philosophy of Education

_____ Instructional Development and Technology (Educational Media, etc.)

_____ Measurement and Evaluation

_____ Sociology in Education

_____ Special Education

_____ Other (Specify)

____

6. State title or present job allocation (check one)

_____ Administrator (specify) ______________________

_____ Audiovisual Technician

_____ College Instructor ______________________

_____ Curriculum Co-ordinator or Consultant

_____ Elementary School Teacher (specify) ______________________

Field Experts' Validation Package (continued)

_____ Librarian

_____ Remedial Teacher (specify)________________________

_____ Secondary School Teacher (specify subjects) ________________________

_____ Special Education

_____ University Instructor/ Professor (specify) ________________________

_____ Other (specify) ________________________

7. State approximate size of the institution in which you are currently employed.

   (a) Approximate Enrollment ____________________

   (b) Faculty Size ____________________

   (c) Other (specify if not an institution). ____________________

8. TECHNIQUE RESPONSE SECTION

   Directions:

   In order to identify your level of competency, level of usage, and how valuable you feel each technique is to Instructional Development, please check the appropriate box for <u>each</u> of categories A., B., and C.

   Further, <u>if you are presently employed in a University, College, or Teacher Training Institution</u> that provides Instructional Development Programs and/or Teacher Training Programs, please indicate whether such programs teach the TECHNIQUES by checking the appropriate box for each of categories D., and E.

Field Experts' Validation Package (continued)

Page 1 of 6.

TECHNIQUE RESPONSE FORM

NAME	A. My Competency Level				B. Value to I.D.				C. My level of Use				D. Does My Prog. Teach It?		E. Teach It To What Degree		
	HI	MED.	LO	NOT FAM.	HI	MED.	LO	NO VALUE	HI	MED.	LO	NONE	YES	NO	HIGH	MED.	LO
Alexander's Method for Determining Components																	
Analysis of Interconnected Decision Areas (AIDA)																	
Authoritative Opinion																	
Appraisal Interview																	
Behavior Modelling																	
Behaviorally Anchored Rating Scale																	
Bloom's Taxonomy																	
Brainstorming																	
Broken Squares																	
Card Sort																	
Case Studies																	
Check Lists																	
Cognitive Mapping																	
Compressed Speech																	
Computer Assisted Instruction																	
Computer Search																	
Content Analysis																	
Contextual Mapping																	

Field Experts' Validation Package (continued)

NAME	A. My Competency Level				B. Value To I.D.				C. My Level of Use				D. Does My Prog. Teach It?		E. Teach It To What Degree		
	HI	MED.	LO	NOT FAM.	HI	MED.	LO	NO VALUE	HI	MED.	LO	NONE	YES	NO	HIGH	MED.	LO
Contingency Management																	
Contract Plan																	
Cost Benefit Analysis																	
Criterion Referenced Measure.																	
Critical Incidents: Technique																	
Critical Path Method (CPM)																	
Dale's Cone																	
Decision Tables																	
Delphi Technique																	
Discovery Technique																	
Discrepancy Evaluation																	
Distance Teaching & Learning																	
Dynamic Programming																	
Ethnography																	
Fault Tree Analysis																	
Feedback																	
Field Test																	
FIRO - B																	

Field Experts' Validation Package (continued)

Page 3 of 6

NAME	A. My Competency Level				B. Value to I.D.				C. My level of Use				D. Does My Prog. Teach It?		E. Teach It To What Degree		
	HI	MED.	LO	NOT FAM.	HI	MED.	LO	NO VALUE	HI	MED.	LO	NONE	YES	NO	HIGH	MED.	LO
Flowcharting																	
Force-Field Analysis																	
Formative Evaluation																	
Function Analysis																	
Futures Wheel																	
Gagne's Taxonomy																	
Galileo System																	
Gaming																	
Gannt Chart																	
Immediate Feedback																	
In-Basket Technique																	
Information Mapping																	
Interaction Matrix																	
Interaction Net																	
Interactive Television																	
Interface Analysis																	
Interpersonal Recall (IPR)																	
Involvement Matrix																	

Field Experts' Validation Package (continued)

NAME	A. My Competency Level				B. Value to I.D.				C. My level of Use				D. Does My Prog. Teach It?		E. Teach it To What Degree		
	HI	MED.	LO	NOT FAM.	HI	MED.	LO	NO VALUE	HI	MED.	LO	NONE	YES	NO	HIGH	MED.	LO
Interviewing Users																	
Johnson-Neyman Technique																	
Krathwohl's Taxonomy																	
Latent Image																	
Learner Verification & Revision																	
Least-Preferred Coworker																	
Likert Scale																	
Linear Programming																	
Literature Search																	
Log Diary																	
Long-Range Planning																	
Management by Objectives (MBO)																	
Managerial Grid																	
Mathetics																	
Matrix Sampling																	
Merit Rating Chart																	
Micro Teaching																	
Monte Carlo Method of Analysis																	

Field Experts' Validation Package (continued)

Page 5 of 6.

NAME	A. My Competency Level				B. Value to I.D.				C. My Level of Use				D. Does My Prog. Teach It?		E. Teach It To What Degree		
	HI	MED.	LO	NOT FAM	HI	MED	LO	NO VALUE	HI	MED.	LO	NONE	YES	NO	HIGH	MED.	LO
Morphological Charts																	
Multidimensional Scaling																	
Multi-Image/Multi-Media Presentation																	
Network Analysis																	
Needs Assessment																	
Nominal Group Process																	
Observation Interview																	
Organization Chart																	
Pair-Associate Learning																	
Participative Management																	
Path Analysis																	
Personal Inverted Filing Syst																	
(PERT) Program Evaluation Review Te.																	
Program Planning Budgeting System (PPBS)																	
Questionnaire																	
Q-Sort																	
Relational Control Analysis																	
Relevance Trees																	

Field Experts' Validation Package (continued)

NAME	My Competency Level				Value to I.D.				My Level of Use				Does My Prog. Teach It?		Teach It To What Degree		
	HI	MED.	LO	NOT FAM	HI	MED.	LO	NO VALUE	HI	MED.	LO	NONE	YES	NO	HIGH	MED	LO
Role Playing																	
Semantic Differential																	
Sensitivity Training																	
Sequencing of Objectives																	
Shaping																	
Simulation																	
Stake Model																	
Standardized Tests																	
Story Boarding																	
Summative Evaluation																	
Synectics																	
Systemic Testing																	
System Transformation																	
Task Analysis																	
Technical Conference																	
Telelecture																	
Trialogue																	
Visual Inconsistencies																	

Field Experts' Validation Package (continued)

ALPHABETICAL LIST OF TECHNIQUES AND THEIR DEFINITIONS

Alexander's Method for Determining Components

Technique to find the right physical components of a physical structure such that each component can be altered independently to suit future changes in the environment.
(Jones, J.C., Design Methods, John Wiley and Sons, Ltd., London, 1970.)

Analysis of Inter Connected Decision Areas (AIDA)

- technique that identifies and evaluates all the compatible sets of sub-solutions to a design problem through the listing of all the sets of options in each decision area that can be combined together without incompatibility and choosing the set that best satisfies a single quantifiable criterion of choice (eg. cost).
(Jones, J.C., Design Methods, John Wiley and Sons Ltd., London, 1970.)

Appraisal Interview

- a verbal communication between employee and management concerning the results of an employee appraisal, in order to encourage present behaviour, or to provide a warning for a behavioral change, or to simply provide information.
(Kay, E., French, J.R., and Meyer, H.J., "A Study of the Performance Appraisal Interview", New York Management Development and Employee Relations Services, General Electric Co., March, 1962.
Norman, R.F. Maier, "Three Types of Appraisal Interview", Personnel, March - April, 1958).

Authoritative Opinion

Descriptive writing based upon the observations of experienced practitioners, or persons who have had direct contact with the environment they seek to describe or explain.
(David, R.C., 1951. The Fundamentals of Top Management, Harper and Row, 1951.
Fayol, H., Industrial and General Administration, International Management Institute., 1930.)

Field Experts' Validation Package (continued)

Behavior Modelling

- technique to enable managers to improve their managerial abilities by imitating "models" who have mastered the requisite skills.
(Bandura, A., Principles of Behavior Modification, New York Holt, Rinehart and Winston, 1960.
Goldstein, A.P. and Sorcher, M., "Changing Managerial Behavior by Applied Learning Techniques", Training and Development Journal, 1973, 36-39.)

Behaviorally Anchored Rating Scale

- rating scale devised to keep a record of good or undesirable incidents occuring in an employee's work, and to minimuze the amount of subjectivity required when rating individuals.
(Schwab, Heneman, and Decotis, "Behaviorally Anchored Rating Scales", pp. 549-551.)

Bloom's Taxonomy

- psychological model that describes the major categories within the Cognitive domain. viz. Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The taxonomy proceeds on the assumption that knowledge is ordered hierarchically, and it is assumed that the six main classes are sequential, moving from knowledge to evaluation.
(Gronlund, Norman E., Stating Behavioral Objectives for Classroom Instruction., MacMillan Co., 1970.)
(Hunt, D.E., and Sullivan, E.V., Between Psychology and Education, (Dryden Press), Hinsdale, Ill. 1974.)

Brainstorming

Technique that enables a group of people to quickly produce many ideas without fear of criticism. Ideas are recorded first and evaluated afterwards.
(Babach, W.J., and Barkelew, A.H., The Babach-Barkelew Brainstorming Book, Synergy Group, Inc., Utica, Mich., 1976.
Havelock, R.G., The Change Agent's Guide to Innovation in Education, Ed. Tech. Publication, Englewood Cliffs, New Jersey, April, 1978.)

Field Experts' Validation Package (continued)

Broken Squares

- technique that enables a group to construct equally sized squares (one for each member) from packages of cut pieces, in order to analyze certain aspects of co-operation in solving a group problem as well as to sensitize group members to some of their own behaviors which contribute to or obstruct the solving of a problem.
(Pfeiffer, J. William and Jones, John E., A Handbook of Structured Experiences for Human Relations Training, Vol. 1, University Press, Iowa, 1969.)

Card Sort

- pact of cards, containing goal statements on each card, is sorted into stacks that have been assigned value points, in order to determine a ranking of goals based upon importance and implementation priorities.
(Witkin, Belle, Ruth, Educational Technology, November, 1977.)

Case Studies

- a technique involving a comprehensive study of an individual, institution, or situation; used to provide detailed information for purposes of appraisal and recommendations.
(Schatzman, L. and Strauss, A., Field Research, Prentice-Hall Inc., Englewood Cliffs, N.J., 1973.)

Checklists

- technique to enable designers to use knowledge of requirements that have been found to be relevant in similar situations by first preparing a list of questions that were determined to be important in similar situations and next asking some or all of these questions about the design that is to be evaluated.
(Jones, J.C., Design Methods, John Wiley & Sons Ltd., London, 1970.)

Cognitive Mapping

- a systematic procedure for visually indicating how a person approaches "new" knowledge (cognitive information) in terms of perception, memory, thinking, and problem solving, based on previous knowledge or rules for acquiring "new" knowledge based on rules derived in learning "old" knowledge.

Field Experts' Validation Package (continued)

(Schulman, Lee S., Research in Education, Vol. 4, F.E. Peacock, 1976.
Anderson, Scarvig B. and others: Encyclopedia of Educational Evaluation, 1975, Joesey Bass Inc.
Thorndike, Robert L. and Hagan, Elizabeth, Measurement and Evaluation, John Wiley and Sons, 1977.)

Compressed Speech

- methods developed for accelerating the recorded speed of speech so as to reduce the time spent listening to the spoken word without significant loss of comprehension.
(Barabasz, A.Y., "A study of recall and retention of accelerated lecture presentation, "Journal of Communication, 1968, 18, 283-287.
Reid, R.H., "Grammatical Complexity and Comprehension of Compressed Speech", Journal of Communication, 1968, 18, 236-242.)

Computer Assisted Instruction

- instructional technique in which the computer contains a stored instructional program designed to inform, guide, control, and test the student until a prescribed level of proficiency is reached.
(Coulson, J.E., Programmed Learning and Computer-Based Instruction, New York, John Wiley & Sons Inc., 1962.
Poirot, J. L. and Groves, D.N., Computer Science For the Teacher, Sterling Swift Pub. Co., Manchaca, Texas, 1976.)

Computer Search (eg. ERIC)

- computerized technique that enables the researcher to search thousands of articles in a short period of time, by the use of key words or descriptors. (eg. Literature Search).
(Thesarus of Eric Descriptors, MacMillan Information, New York, N.Y.)

Content Analysis

- a method of analysing communication for the purpose of measuring variables, by studying the communications that people have produced and asking questions of the communications.
(Kerlinger, F.N., Foundations of Behavioral Research, 1964.

Field Experts' Validation Package (continued)

Harder, M.D., (Ed.), Content Analysis As A Research Tool for Higher Education.)

Contextual Mapping (Time-Independent Contextual Mapping)

- a future forecasting technique based upon a graphic (flowchart) depiction of past trends and their interrelationships.
(Forrester, Jay W., "Counterintuitive Behavior of Social Systems", Technology Review, January 1971.
Hencley, Stephen P. and Yates, Futurism in Education: Methodologies, McCatchan Pub. Corp., Berkeley, California, 1974.)

Contingency Management (see Least-Preferred Co-worker)

Contract Plan

- a written agreement between the student and teacher which lists a set of goals, skills, and assignments to be completed by the student within a reasonable time.
(Haddock, T., "Individual Instruction Through Student Contracts", Arizona Teacher, May 1967.)

Cost-Benefit Analysis

- a generic term for such techniques as ZERO-BASED BUDGETING, COST EFFECTIVENESS, COST EVALUATION, etc., which assist the decision-maker in making a comparison of alternative courses of action in terms of their costs and effectiveness in attaining some specific objectives.
(Forbes, R.H., "Cost-effectiveness analysis: Primer and Guidelines", Educational Technology, 1972.
Prest, A.R. and Turvey, R., "Cost-benefit Analysis: A Survey", The Economic Journal, 1965, pp. 683-735.
Wilkinson, G.L., "Cost evaluation of Instructional Strategies", Communication Review, 1973.)

Criterion Referenced Measurement

- tests constructed to yield measurements that are directly interpretable in terms of specified performance standards.
(Humbleton, R.K., and Gorth W.P., "Criterion-Referenced Testing: Issues and Applications", Mass University Amherst School of Education, Sept. 1971, ED 60025.
Jones, J.W., "A study of the Congruency of Competencies and Criterion-Referenced Measures", May 1977, ED 0142575.)

Field Experts' Validation Package (continued)

Critical Incidents Technique

- technique to acquire information on specific behavior patterns of a subject by interviewing the subject's work supervisor in order to ascertain behavior patterns relating to the skills being studied.
(Borg, W.R. and Meredith D.C., Educational Research and Introduction, David McKay Co. Inc., pp. 249-251, New York, 1976.
Flanagan, J.C., "The Critical Incident Technique", Psychological Bulletin, 51; 327-358. 1954.)

Critical Path Method (CPM)

- technique to aid researchers with the planning, scheduling expediting and progress monitoring tasks involved in a specific project by diagramatically platting work activities and events in sequence and determining the longest time (CPM) needed to complete the project.
(Collins, F.T., Network Planning and Critical Path Scheduling, KnowHow Publications, 1965.)

Dale's Cone

- pyramid-shaped model wherein learning is depicted as moving from the concrete (base of the pyramid) to the abstract (apex of the pyramid).

Decision Tables

- alternative to a flowchart for presenting the logic of a problem, wherein the table is a set of decision rules in which each rule identifies a set of conditions with its set of actions; it is divided vertically by condition statements and action statements and divided horizontally by stubs and entries.
(Hussain, K.M., Development of Information Systems for Education, Englewood Cliffs, N.Y., Prentice Hall Inc., 1973.)

Delphi Technique

- a futurist research method which utilizes the systematic solicitation and combination of informed judgements from a group of experts on questions or issues relevant to the future.

Field Experts' Validation Package (continued)

(Helmer, O., Analysis of the Future: The Delphi Method, Santa Monica, Ca., The Rand Corp., 1967.
Helmer, O. and Dalkey, N.C., "An experimental Application of the Delphi Method of the Use of Experts", Management Science, IX (April 1963) pp. 458-467.
Weaver, W.T., Phi Beta Kappan, "The Delphi Forecasting Method", January 1971.)

Discovery Technique (Discovery Learning Model)

- learning model by which the student problem solves through discovering a new method rather than relying upon prior knowledge and procedures.
(Travers, R.M.W., Second Handbook of Research on Teaching, American Educational Research Assoc., Chicago, 1973.
Bruner, J.S., Toward a Theory of Instruction, Belknap Press, 1966.)

Discrepancy Evaluation

- method to identify differences between two or more elements of an educational or training program in order to determine how they might be corrected or reconcilled; differences are examined on the basis of logical rationale or statistical criteria.
(Stake, R.E., Review of Educational Research, "Objectives, Priorities, and Other Judgment Data", Vol. 40, 1970.)

Distance Teaching and Learning

- teaching by correspondence through the use of the printed medium, radio, television, computer, recordings, tapes, or a combination of the above.
(Good, H.M., and Trotter, B., University Teaching, "Frontiers in Course Development: Systems and Collaboration", Council of Ontario Universities, Jacksons Point.)

Dynamic Programming

- technique concerned with multi-stage decision processes and problems which can be interpreted as such, based upon Bellman's Principle of Optimality.
(White, D.J., Dynamic Programming, Oliver and Boyd, Edinborough, 1969.
Norman, J.M., Heuristic Procedures in Dynamic Programming.)

Field Experts' Validation Package (continued)

Ethnography

- type of research that attempts to present a picture of the way of life of some group of people in terms of both process and product, in an analytical and multi-layered fashion.
(Pelto, Pertti J. and Pelto, Gretel H., Anthropological Research, 2nd Edition, Cambridge University Press, Cambridge, 1978.
Schatzman, L. and Straus, A.L., Field Research, Prentice-Hall Inc., Englewood Cliffs, N.J., 1973.)

Fault Tree Analysis

- operations research method for predicting the most probable ways by which a system or part of it might fail through the use of a logic network of events combined with a systematic method for qualitative and quantitative analysis.
(Ericson, C., SystemSafety Technology-Fault Tree Analysis, The Doeing Co., Seattle, Wash., Report #02-113-072-2, 1970.
Witkin, B.R., and Stephens, K.G., A Fault Tree Analysis of Organizational Communication Systems, Western Speech Communication Association, Honolulu Hawaii, November 1972.
Witkin, B.R. and Stephens, K.G., Fault Tree Analysis: A Research Tool Educational Planning, Technical Report #1, Alameda County Pace Center, Hayward California, October 1968.)

Feedback

- generative term that encompasses a number of techniques (including programmed texts, pull-tab response cards, Latent Image, etc.), which gives the learner an immediate response as to the correctness of his answers. It may also refer to data collected by researchers for purposes of evaluation.
(Glaser, R. and Cooley W.W., "Instrumentation for Teaching and Instructional Management", Second Handbook of Research on Teaching, R. Travers (Ed.), Randy McNally College Pub. Co., Chicago, 1973.)

Field Test

- the assessment of a near-final model in an appropriate situation, according to specified criteria, for the purpose of determining what modifications of

structure and performance are necessary (AECT).
(Klausmeier, H., "Research & Development toward the Improvement of Education", _Journal of Experimental Education_, 37 (1968).
"The Public Interest vis a vis Educational Research & Development", _Journal of Research & Development in Education_, 2 (1969).

FIRO-B (Fundamental Interpersonal Relations Orientation-Behavior)

- a fifty-four statement scale which produces 6 scores (nine in each of the 6 scores) which measures the expression of orientation by the subject to which one joins and includes others, controls and leads others, and is friendly and personal with others.
(Pfeiffer, J.W., Heslin, R., Jones, J.E., _Instrumentation in Human Relationships Training_, La Jolla, California, University Press Assoc., 1976.
Schutz, W.C., Firo: _A Three Dimensional Theory of Interpersonal Behavior_, Rinehart & Winston, New York, 1958.)

Flowcharting

- graphic representation for the definition, analysis, or solution of a problem, in which _symbols_ are used to represent operations, data, flow, and equipment, etc.
(Chapin, N., "Flowcharting with ANSI Standards: A Tutorial", _Computing Surveys_, II, June 1970.
Enrick, N.L., _Effective Graphic Communication_, New York, Averback Publishers, 1972.
Schiber, T.J., _Fundamentals of Flowcharting_, New York, J. Wiley and Son, 1969.)

Force-Field Analysis

- graphic method of analysing the forces providing thrust towards or facilitating change, and the forces hindering change in a particular situation.
(Lewin, K., "Frontiers in Group Dynamics: Concept, Method and Reality in Social Science", _Human Relations_, Vol. 1, No. 1, June, 1947.
Giammato, M.C., "Suggested Activities for Learning About Role Behaviors, Problem Solving and Force Field Techniques", _Northwest Regional Education Laboratory_, 1969, ED030160.)

Field Experts' Validation Package (continued)

Formative Evaluation

- attempts to collect appropriate evidence <u>during</u> the construction and trying-out of a new curriculum, etc. in such a way that revision of it can be based on this evidence; evaluation of instructional programs while they are still in some stage of development.
(Anderson, S.B., Ball, S., and Murphy, R.T., Encyclopedia of Educational Evaluating, San Francisco. Jossey Bass Pub. 1975.
Bloom, B.S., Hasting, J.T. and Madaus, G.F., Handbook on Formative and Summative Evaluation of Student Learning, New York, McGraw-Hill, 1971.)

Function Analysis

- in the Roger Kaufman Model for Educational Systems Planning, the Function Analysis stage is the process for determining requirements and subfunctions for accomplishing all of the elements stated in the objectives and problem identification stage; concerned with identifying the "whats" that have to be accomplished rather than the "hows".
(Kaufman, R.A., Educational System Planning, Prentice-Hall Inc., Englewood Cliffs, N.J., 1972.)

Futures Wheel

- futurist technique that graphically helps the user to visualize the impact of a single forecast in one or more areas through the build up of interconnecting circles, each containing a related forecast.
(Gunn, Jerry & Guy, "Easy Ways to Help Children Think About the Future", The Futurist, August 1974.)

Gagne's Taxonomy

- cognitive learning theory described as a hierarchy of learning processes that become increasingly complex, and which places more emphasis upon learning and less on the development aspect.
(Hunt, D.E., and Sullivan, E.V., Between Psychology and Education, Dryden Press, Hinsdale, Illinois, 1974.)

Galileo System

- series of procedures for making a mental map of an audience by identifying the main concepts it uses to understand and define a topic; Galileo measures the beliefs and concepts that an audience holds concerning the topic

under study.
(Woelfel, J., Galileo IV, A Program of Metric Multidimensional Scaling, Honolulu, Hawaii, East-West Communication Institute, 1977.
Gilham, J. and Woelfel, J., "The Galileo System: Preliminary Evidence for Precision, Stability and Equivalence to Traditional Measures", Human Communication Research, Fall, 1976.)

Gaming (Simulation)

- technique that provides a context for the acquisition of abstract conceptual tools which allow a participant to view new and emerging situations; elements common to most simulation techniques are role playing, a problem defining scenario, operating procedures, and an accounting system.
(Coombs, D.H., "Is There a Future for Simulation and Gaming Research?", Educational Communication and Technology Journal, Vol. 26, No. 2, Summer, 1978.
Spannaus, T.W., "What is Simulation?", Audio Visual Instruction, May, 1978.)

Gannt Chart

- a means of graphically illustrating a production schedule; the horizontal axis is used to depict time, with activities, items, or personnel listed vertically in the left-hand column.
(Dessler, Gary, Management Fundamentals: A Framework, Reston, Va., Reston, 1977.
Longenecker, J.G., Essentials of Management: A Behavioral Approach, Columbus, Ohio, Charles Merill Pub. Co., 1977.)

Immediate Feedback (See Feedback)

In-Basket Technique

- technique to analyze a participant's decision-making abilities, managerial, and problem-solving skills, whereby she/he receives a "situation" set up on a memo to which a considered response is compared to answers suggested by field experts.
(French, W., The Personnel Management Process, 4th ed., Boston, Houghton Mifflin, 1978.
Ward, L.B., "The Use of Business Problems", Management Record, 22:30-33, June 1960.)

Field Experts' Validation Package (continued)

Information Mapping

- system of graphically presenting information on a series of pages in the form of COBOL: each page is broken with horizontal lines dividing "chunks" of information into Definitions, Examples, Rules, etc.
(Glaser, R., Teaching Research and Education, New York, Wiley, 1965.
Horn, R.E., "Information Mapping: New Tool to Overcome the Paper Mountain", Educational Technology. Vol. 15, No. 5. May 1974 p. 5-8.)

Interaction Matrix

- technique to permit a systematic search for connections between elements within a problem, whereby a matrix is set up in which every element of the design problem can be compared with every other on a three-point scale (0-2) of connections.
(Jones, J.C., Design Methods, John Wiley and Sons Ltd., London, 1970.)

Interaction Net

- a graphic display of points linked by lines of connections which illustrate the patterns of connections between elements within a design problem as discovered in the use of an Interaction Matrix.
(Jones, J.C., Design Methods, John Wiley and Sons Ltd., London, 1970.)

Interactive Television

- system to communicate over a distance on a face-to-face basis by means of 2-way audio and video signals.
(Hayes, J., "Interactive Communication is Goal of C.C.T.V. Network", Biomedical Communication, 1974.
Wittson, L.L. and Benschoter, R., "Two-way Television: Helping the Medical Center Reach Out", American Journal of Psychiatry, 129:5, pp. 624-677.)

Interface Analysis

- a method of analyzing a system by graphically depicting and hence analyzing each of the sub-systems that interface or adjoin one another.
(Kindred, A.R., Data Systems and Management, Prentice-Hall Inc., Englewood Cliffs, N.J., 1973.)

Field Experts' Validation Package (continued)

Interpersonal Recall (IPR)

- technique to help developers expand their capacities of interpersonal communication and awareness of their own interpersonal styles and behaviors.
(Kagan, N. and Burke, F., "Influencing Human Interaction", Student Manual MSU, ED 484, 1976.)

Involvement Matrix

- technique that serves as a prelude to effective systems design with provision for actions to solve procedural problems; developers and/or organizations are represented on one axis while the general tasks are represented on the other, while the resulting interest cells contain specific decisions regarding the level of responsibility and specific task assignments are delineated.
(Springer, H.C. and Giles, F.T., "The Involvement Matrix: A Prelude to Effective Systems Design", in Educational Technology, Vol. 12 No. 8, August 1972 p. 49-51.)

Interviewing Users

- technique to elicit information that is known only to users of a product or system in question.
(Jones, J.C., Design Methods, J. Wiley & Sons Ltd., London, 1970.)

Johnson-Neyman Technique

- A technique that can be used to identify the subgroups for which differences will be significant, by determining the permissable value on extraneous variables leading to significant differences on the criterion variable.
(Johnson, P.O., Fay, L., "The Newman-Johnson Technique, It's Theory and Applications, Psychometrika, 1950, Vol. 15.
Abelson, R.P., "A Note on the Neyman-Johnson Technique, Psychometrika, 1953, Vol. 1, No. 18 pp. 213-217.)

Krathwohl's Taxonomy

- psychological model that describes the major categories within the Affective Domain; viz. Receiving, Responding, Valuing, Organization, and Characterization by a Value or Value Complex.
(Gronlund, N.E., Stating Behavioral Objectives for Classroom Instructions, MacMillan Co., 1970.)

Field Experts' Validation Package (continued)

Latent Image

- technique that uses chemically treated response sheets to provide immediate feedback to subjects upon answering test questions.
(Nil).

Learner Verification and Revision (LVR)

- involves the concepts of evaluation, revision and decision to implement developed by Kenneth Komoski, and intended for use as an index of quality for educational materials; involves the tryout of a prototype educational product on the target audience to determine its weaknesses prior to revision.
(Kandaswamy, S. et al. "Learner Verification and Revision: An Experimental Comparison of Two Methods", A.V. Communication Review, Fall 1976.
Stolovitch, H.D., "The Intermediate Technology of Learner Verification and Revision", Educational Technology, February 1978, p. 13-17.)

Least-Preferred Coworker

- Technique to determine leadership style through the use of a set of sixteen adjective pairs on bipolar scales on a questionnaire (Semantic differential); a favourable description (high LPC) of the least preferred coworker is assumed to indicate a relationship-oriented leadership style, whereas an unfavourable description (low LPC) is assumed to indicate a task-oriented leadership style.
(Fiedler, F.E., "Personality and Situational Determinants of Leader Behaviour", Department of Psychology, University of Washington, Technical Report 71-18, June, 1971.
French, W., The Personnel Management Process, 4th ed., Boston, Houghton Mifflin, 1978.)

Likert Scale

- to obtain summated ratings of information pertinent to affective variables, by responding to statements which are both favourable and unfavourable to the phenomenon under study; responses range on a scale of five (from "strongly agree" to "strongly disagree") and are thus analyzed to determine which items discriminate best between the high-scoring individuals and the low-scoring individuals.

Field Experts' Validation Package (continued)

(Social Research, Phillips 1966.
Educational and Psychological Measurement and Evaluation, Stanley & Hopkins.)

Linear Programming

- program in which the sequence of information presented to the students is fixed so that all students are given the same stimulii in exactly the same sequence followed by testing, followed by new information; based upon the stimulus-response works of Pressy and Skinner.
(Brown, J.V., Lewis, R.B., Harceroad, F.F., AV Instruction Media and Methods, New York, McGraw-Hill Book, 1969.
Hartley, J., "Programmed instruction 1954-1974: A Review", Programmed Learning and Educational Technology, July, 1975.)

Literature Search

- to find published information that can favourably influence the designers' output and that can be obtained without unacceptable cost and delay.
(Jones, J.C., Design Methods, John Wiley & Sons Ltd., London, 1970.)

Log Diary

- technique to determine the activities and functions of a professional whereby such are mapped on a form containing activities listed vertically on the left side and half hour (or hour) intervals listed horizontally across the top.
(Anderson, S.B., Ball, S., Murphy, R.T., and Assoc., Encyclopedia of Educational Evaluation, Jossey-Bass Pub., San Francisco, California, 1975.)

Long-Range Planning

- methodology to develop an adaptive planning program consisting of "alternative future" general plans and derivative plans for the major components of the agency in questions; methods range from establishing goals, through developing plans for each alternative future, through selecting one alternative future plan and developing monitoring and shifting procedures.
(Chase, R.B. and Clark, D.C., "Long Range Planning in School Districts", Educational Technology, Vol. 4, 1974.
Salmon, R.D., "Developing a Long Range Planning System for Higher Education", School and Community, May 1971.)

Field Experts' Validation Package (continued)

Management by Objectives (MBO)

- process whereby the superior and subordinate managers of an organization jointly identify its common goals, define each individual's major area of responsibility in terms of the results expected, and uses these measures as guides for operating the unit and assessing the contributions of each of its members.
(Hollman, R.W., "Applying MBO Research to Practice", Human Resources Management, Winter, 1976.
Stein, D.I., "Objective Management Systems: Two to Five Years After Implementation", Personal Journal, 54: 525-84, October, 1975.)

Managerial Grid

- technique devised by Blake and Mouton to describe managerial style and to predict interpersonal effectiveness and leadership skills based on a two-dimensional grid; where one dimension is concerned for people and the other is concerned for production or task orientation.
(Bernardin, H.J. and Alvares, K., "The Managerial Grid as a Predictor of Conflict Resolution and Managerial Effectiveness," Bowlin Green State University.
Blake, R.R. and Mouton, J.S., The Managerial Grid, Houston, Gulf Pub. Co., 1964.)

Mathetics

- a training system to determine what to teach, a basis for determining strategy decisions, and a detailed procedure for contructing a lesson; those goals are attained through a series of ten steps which include occupational analysis, task selection, task analysis, population analysis, etc.
(Gilbert, T.F. "Mathetics: II The Description of Teaching Exercises", Journal of Mathetics, Vol. 1, April 1962.
Gilbert, T.F., Mathetics: "The Technology of Education", Journal of Mathetics, Vol. 1, January, 1962.)

Matrix Sampling

- a general statistical procedure of random sampling that increases efficiency by reducing the number of students involved in testing, wherein "K" test items are subdivided randomly into "t" subtests containing "K" items each with a subtest administered to "n" examinees selected randomly from the population of "N" examinees.

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(Sirotnik, K., "An Introduction to Matrix Sampling for the Practitioner", Evaluation in Education: Current Application, Berkeley, California: McCutchan Pub. Corp., 1974.)

Merit Rating Chart

- method for determining employee progress and value to an organization whereby the rater places a check mark on a form next to the word or phrase describing the degree of merit for each of several different traits, such as "quality of work", "quantity of work", "co-operation", and so forth; degrees of merit run from "inadequate" to "superior".
(Miller, Richard V., Merit Rating in Industry: A Survey of Current Practices and Problems", L.L.R. Research, 5:14, Fall, 1959.
Tiffin, J., "6 Merit Rating Systems", Personal Journal 37:288, January 1959.)

Micro Teaching

- practice which allows pre-service or in-service teachers to develop or improve skills in applying a particular teaching technique, whereby a lesson is planned which concerns a single, unique topic to be presented to a small group of students, in a small time frame.
(Sadkeg, Myra and David, "Microteaching for Affective Skills", The Elementary School Journal, 1976.)

Monte Carlo Method of Analysis

- futurist or prediction technique of using a computer and random numbers to simulate a real-world situation such as studies of population growth, or the evaluation of complicated integrals.
(Cooley, W.W. and Lohnes, P.R., Introduction to Statistical Procedures with Computer Exercises, New York, Wiley, 1968.
Hammersley, J.M. and Handscomb, D.C., Monte Carlo Methods, London, Methuem and Co. Ltd., 1965.)

Morphological Charts

- technique to widen the area of search for solutions to a design problem by defining the functions that the design must be able to perform, listing on a chart a wide range of sub-solutions or alternative means of performing each function and then selecting an acceptable set of

sub-solutions, one for each function.
(Jones, J.C., Design Methods, John Wiley & Sons Ltd., London, 1970.)

Multidimensional Scaling

- aim is to develop procedures which will assign sets of numbers to various quantities of attributes so that the numbers directly reflect varieties in the quantities of the attributes; produces a range of scores that have meaning with respect to each other's values or to some arbitrary or absolute value set accepted by the scale.
(Sheperd, R.N., Multidimensional Scaling: Theory and Applications in the Behavioral Sciences, New York, Seminar Press, 1972.
Torgerson, W.S., Theory and Methods of Scaling, New York, Wiley and Sons, 1958.)

Multi-Image/Multi-Media Presentation

- the integration of more than one medium in a complementary manner in a presentation or module of instruction.
(Wittich, W.A. and Schuller, C.F., Instructional Technology, Its Nature and Use, Harper & Row, New York, 1973.)

Needs Assessment (eg. PDK Model)

- The process in which "real-world" data is collected from individuals and groups involved in a particular educational situation to determine the nature of the problem, to determine how the group involved (learners, implementers, community) value what exists (status quo), what should be (the ideal situation) and the discrepancy between what is and what should be, and to prioritize the problems and discrepancies.
(Anderson, S.B., Ball, S., and Murphy, R.T., Encyclopedia of Educational Evaluation, San Francisco, Jossey-Bass Pub., 1975.
Witkin, B.R., Educational Technology, November, 1977.)

Network Analysis

- A specific process by which an existing communication network within an organization may be analyzed in terms of the flow of its essential and/or social information; under investigation are the network's groups, liason personnel, isolates, bridge links, etc.

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(Havelock, R.G., The Change Agent's Guide to Innovation in Education, Educational Technology Pub., Englewood Cliffs, N.J., 1975.)

Nominal Group Process

- method to generate and prioritize ideas regarding problem-solving, job performance improvement, etc. whereby each member of a study group generates ideas that are listed before the group, ranked, and valued (1-5), and finally prioritized.

(Albanese, R., Managing: Toward Accountability for Performance, Homewood, Ill., Irwin, 1978.

Delbecq, A.L., VandeVen, A.H., "Nominal Group Techniques for Involving Clients and Resource Experts in Program Planning", Academy of Management Proceedings, 1970.)

Observation Interview (eg. Time-Motion Studies)

- method to define a task, analyze a job, or perform needs assessment or evaluation, whereby the investigator observes and questions an interviewee at the work site while the practitioner performs the activities under investigation.

(Anderson, S.B., Ball, S., Murphy, R.T. and Associates, Encyclopedia of Educational Evaluation, Jossey-Bass Pub., San Francisco, California, 1975.

Bergman, A.B., Dassel, S.W., and Wedgwood, R.J., "Time-motion Study of Practicing Pediatricians", Pediatrics, 38:254-263, 1966.)

Organization Chart

- chart graphically depicts the various departments, relationships, and lines of authority within an enterprise, including the major functions, channels of supervision and relative authority and responsibility of each employee in a position of authority.

(Dessler, G., Management Fundamentals: A Framework, Reston, Va., Reston, 1977.

Lott, R.W., Basic Systems Analysis, San Francisco, Canfield, 1971.)

Pair-Associate Learning

- may be used for instructional and measurement purposes to determine the learner's ability to associate pairs of sounds, words, pictures, or word/picture combinations in order to investigate the meaningfulness,

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familiarization, or similarity of stimulus members and response members.
(Batting, W., "Analysis of Paired-Associate Learning", John Cook, Studies in Guided Learning.
Gross, A., Paired-Associates Learning: The Role of Meaningfulness, Similarity, and Familiarization.

Participative Management

- leadership style which modifies patterns of supervision by encouraging workers to make decisions for themselves and to participate more in planning and policy making functions; eg. McGregor's Theory Y of Leadership.
(McFarland, D.T., Management: Principles and Practices, Second Edition, Macmillan Co., New York, 1964.
Wortman, M.S., and Luthans, F., Emerging Concepts in Management, The Macmillan Co., London, 1969.)

Path Analysis

- technique for investigating the interrelationships of a set of variables within the context of a causal model, in which every included variable in a qualitative diagram (measured or hypothetical), is represented by arrows either as completely determined by certain others or as an ultimate factor.
(Anderson, J.G., and Evans, F.B., "Causal Models in Education Research: Recursive Models", American Educational Research Journal, 1974, Vol. II, pp. 29-39.
Wright, S., "Path Coefficients and Path Regressions, Alternative or Complementary Concepts?", Biometrics, 1960, Vol. 16, pp. 189-202.)

Personal Inverted Filing System (PIFS)

- filing and retrieval system whereby documents are filed by accession numbers which are in turn entered on alphabetized Scan-Match Sheets containing appropriate descriptors.
(Holmes, T.F., and Gentry, C.G., "A Foolproof Personal Filing System", Audiovisual Instruction, May 1979.)

Program Evaluation Review Technique (PERT)

- a systematic timetabling and programming technique developed to measure, monitor, and control the development and progress of a project or program, wherein a network of events and work activities is identified, including the critical path of the one which takes the longest time to

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complete.
(Cook, D.L., Program Evaluation and Review Technique: Applications in Education, U.S.H.E.W., Office of Education, No. 17, 1966.
Kohn, M., Dynamic Managing: Principles, Process, Practice, Melno Park, California, Cummings, 1977, pp. 121-128.
Lott, D.R., Basic Systems Analysis, New York, Onfield Press, 1971.)

Program Planning Budgeting System (PPBS)

- a planning budgeting system in which resources are allocated according to specified project or program needs it directly relates substantive planning to fiscal planning requiring a detailed operational plan to which costs are then assigned on a programmatic, rather than on a line item basis.
(Kindred, A.R., Data Systems and Management, Prentice-Hall, Englewood Cliffs, N.J., 1973.)

Questionnaire

- instrument for recording data ranging from sociological opinions and attitudes to psychological variables which include opinions, attitudes and behavior; technique to obtain responses and reactions from a large number of individuals who could not be interviewed personally within a short period of time without considerable expense.
(Bloom, Benjamin S. & Hastings, Mabaus, G.F., Handbook on Formative and Summative Evaluation of Student Learning, New York, Holt, McGraw-Hill Co., 1971.
Kerlinger, F.N., Foundations of Behavioral Research, 2nd Edition, New York: Holt, Rinehart & Winston, 1973.)

Q-Sort

- attitude measurement technique with scores based on self-reports, a personality inventory in which the subject sorts a considerable number of cards containing attitudinal statements into categories that represent the degrees to which the statements apply to him/her.
(Caggiano, R., "The Relationship Between the Value and Attitudes of Elementary School Teachers and Pupils Regarding Pupil Behaviors", Graduate Research in Education and Related Disciplines, Vol. 6, No. 1. 1970.

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Kerlinger, F.N., "The Attitude Structure of the Individual: A Q-Study of the Educational Attitudes of Professors and Laymen", Genetic Psychological Monographs, No. 53, 1956.)

Relational Control Analysis

- technique that combines the assumption that messages contain both report (content) and command (relational) aspects: it involves a coding technique that defines message sequences, indexes relational control, and maps transactional patterns as they unfold over time, to study the control dimension of a relationship.
(Ericson, R.M. and Rogers, L.E., "New Procedures for Analyzing Relational Communication", Family Process, 12-245-267, 1973.
Rogers, L.E. and Farace, R.V., "Analysis of Relational Communication in Dyado New Measurement Procedures", Human Communication Research, 222-239, 1975.)

Relevance Trees

- normative forecasting by graphically illustrating the steps required to meet a predetermined goal; future needs and goals are determined and then a hierarchy of events which must occur for the attainment of the goals, are traced backwards to the present.
(Esch, M.E., "Honeywell's Pattern Planning Assistance Through Technological Evaluation of Relevance Numbers", In A Guide to Practical Technological Forecasting, Englewood Cliffs, N.J., Prentice-Hall, 1973.
Yates, J.R., & Hencley, S.P., Futurism in Education, McMillan Publishing, 1974.)

Role Playing

- instructional technique involving a spontaneous portrayal (acting out) of a situation, condition, or circumstance by selected members of a learning group who assume either overtly or in imagination, of the part or function of another or others.
(Cooper, J., American Psychologist, August 1976.
Keller, C.W., "Role Playing and Simulation in History Classics", The History Teacher, August 1975, Vol. VIII, No. 4.)

Semantic Differential

- technique to determine the underlying meaning as well as value of a given concept which are measured in dimensions of Evaluation, Potency, and Activity; subjects

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are asked to rate a given concept by locating it between two polar adjectives which are divided by seven (7) units. (Semantic Differential Social Research, Phillips, 1966. Educational and Psychological Measurement and Evaluation, Stanley & Hopkins.)

Sensitivity Training

- technique involving a situational T-group experience that is designed to increase sensitivity toward the needs and attitudes of others and to increase one's individual self-awareness.

(Delbecq, A.L., Sensitivity Training, in Contemporary Readings in Organizational Behavior, ed. by F. Luthans, McGraw-Hill, 1972.
House, R.J., 1967 "T-group education and leadership effectiveness: A review of the empiric literature and a critical evaluation", Personnel Psychology, 20, 1967.)

Sequencing of Objectives

- objectives are sequenced according to a number of different methods in order to facilitate learning.

(Popham, W.J., and Baker, E.L., Systematic Instruction, Englewood Cliffs, N.J., Prentice-Hall, 1970.
Posner, G.J. and Strike, K.A., "A Categorization Scheme for Principles of Sequencing Content", Review of Educational Research, Fall 1976, 46 (4), 665-689.)

Shaping

- a method of successive approximation to teach humans and animals a new skill; it reinforces behaviors that approximate the final performance one wants the subject to perform by shaping the learner's behavior by rewarding him whenever he is successful in approximating the skill being taught.

(Davis, Alexander, and Yelon, S., Learning Systems Designs, Michigan State University, East Lansing, Michigan.)

Simulation (see Gaming)

Stake Model (Evaluation)

- technique intended for the evaluation of educational programs by providing data for decision-making; it provides measurements on a matrix of the match between what an educator intends to do and what she/he actually

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accomplishes.
(Anderson, S.B., Ball, S., and Murphy, R.T., Encyclopedia of Educational Evaluation, Jossey-Bass Pub., San Francisco, 1975.)

Systemic Testing

- technique to identify actions that are capable of bringing about desired changes in situations that are too complicated to understand, through the selection of the most promising and the least harmful of tests, system constraints as an avenue for planning and achieving the desired changes.
(Jones, J.C., Design Methods, John Wiley and Sons, London, 1970.)

System Transformation

- method of transforming an unsatisfactory system so as to remove its inherent faults and finding a sequence of changes (transformation route or evolutionary pathway) that would allow the existing components to evolve into the new ones.
(Jones, J.C., Design Methods, John Wiley & Sons, London, 1970.)

Task Analysis (Task Description)

- the analysis and synthesis of a real world behavior and/or situation, including knowledge, skills and attitudes, including (a) a listing of the activities performed, (b) an indication of the sequence and relationships among the knowledge, skills and attitudes, (c) the conditions under which the knowledge, skills and attitudes occur, and (d) the acceptable criteria for knowledge, skills and attitudes performance.
(Davis, I.K., "Task Analysis: Some Process and Content Concerns", AVCR 1973, Spring pp. 73-83.
Duncan, K., Hartley, J. (ed), "Strategies for Analysis of Task", Strategies for Programmed Instruction: An Educational Technology, London, 1972.
Gagne, R.M., Task Analysis - Its Relation to Content Analysis, A paper presented at the annual meeting of the American Educational Research Assoc., Chicago, April 1974.)

Field Experts' Validation Package (continued)

Technical Conference

- a group of high-level technical or subject matter experts are brought together to collectively determine the responsibilities and procedures of a set position.
(Goldstein, I.I., Training Program Development and Evaluation, Wadsworth Pub. Co. Inc., Belmont, California, 1974.
Segall, Asher, Vanderschmidt, Hannelure, Burglass, Ruanne and Frostmas, Thomas, Systematic Course Designed for the Health Fields, John Wiley and Sons Inc., New York, 1975.)

Standardized Tests

- an instrument constructed in accord with detailed specifications, in which the items have been selected after trying out for appropriateness in difficulty and discriminating power, one which is accompanied by a manual giving definite directions for uniform administration and scoring, and one which provides relevant and dependable norms for score interpretations.
(Borg, W.R. and Gall, M.D., Educational Research (2nd), David McKay Co., New York, 1971.
Buros, O.K., The Mental Measurement Yearbook, Gryphon, Highland Park, N.J.)

Story Boarding

- the activity of preparing a series of sketches or pictures and any accompanying text used to visualize each topic or item in an audiovisual material (or presentation) to be produced; usually used for planning.
(Kemp, J.E., Planning and Producing Audiovisual Materials, Chandler Publishing Co., 1968.
Brown, L., A.V. Instruction, Technology, Media, and Methods, McGraw-Hill Book Co., 1973.)

Summative Evaluation

- evaluation intended to provide data for product validation and oriented to consumer-administration-teacher criteria and standards, used to assess the overall effectiveness of some program of material.
(Anderson, S.B., Bull, S., Murphy, R.T., and Associates, Encyclopedia of Educational Evaluation, San Francisco, Josse-Bass Inc. 1973.
Bloom, B.S., Hastings, T., Mabaus, G.F., Handbook on Formative and Summative Evaluation of Student Learning, New York, McGraw-Hill Book Co., 1971.)

Field Experts' Validation Package (continued)

Synectics

- problem solving and design technique that provides for the spontaneous activity of the brain and the nervous system towards the exploration and transformation of design problems, through the use of analogies; use is made of the black box view of designing.
(Jones, J.C., Design Methods, John Wiley and Sons Ltd., London, 1970.
Weinberg, G.M., An Introduction to General Systems Thinking, John Wiley and Sons Ltd., New York, 1975.)

Telelecture

- an arrangement which brings a teacher or any lecturer to the classroom audience via regular telephone lines enabling the speaker to participate with several classes simultaneously at different locations; the installation may provide two-way communication between speaker and audience.
(Chu, C.G., and Schramm, W., Learning From Television: What The Research Says, The National Society of Professionals in Telecommunications, Stanford, November, 1967.
Schramm, W., (ed), Quality in Instructional Television, University Press of Hawaii, Honolulu, 1972.)

Trialogue

- an application of multimedia used in school systems to plan and disseminate projects tailored around the use of two or more media, wherein planning and project construction issues are discussed before producing the project (u h as function of the program, effects of learning aids, the roles of teachers, etc.)

Visual Inconsistencies (Search for)

- through the examination of examples and/or photographs of an existing design, the developer attempts to identify design conflicts and compromises that may have been necessary in the past but may be avoidable in the future.
(Jones, J.C., Design Methods, John Wiley and Sons, London, 1970.)

Field Experts' Validation Package (continued)

TECHNIQUE RATING INSTRUMENT

Rate each of the following techniques as to its value to instructional development. CIRCLE one number only. If you know the technique by another term, write such in the blank provided.

4 = extremely high value

3 = high value

2 = valuable

1 = low value

0 = no value OR not a technique

TECHNIQUE	ALTERNATE TERM	RATING
Alexander's Method for Determining Components	________________	4 3 2 1 0
Analysis of Inter Connected Decision Areas (AIDA)	________________	4 3 2 1 0
Authoritative Opinion	________________	4 3 2 1 0
Appraisal Interview	________________	4 3 2 1 0
Behavior Modelling	________________	4 3 2 1 0
Behaviorally Anchored Rating Scale	________________	4 3 2 1 0
Bloom's Taxonomy (Classifying Objectives)	________________	4 3 2 1 0
Brainstorming	________________	4 3 2 1 0
Broken Squares	________________	4 3 2 1 0
Card Sort	________________	4 3 2 1 0
Case Studies	________________	4 3 2 1 0

Field Experts' Validation Package (continued)

Checklists	______________	4 3 2 1 0
Cognitive Mapping	______________	4 3 2 1 0
Compressed Speech	______________	4 3 2 1 0
Computer Assisted Instruction	______________	4 3 2 1 0
Computer Search (eg. ERIC)	______________	4 3 2 1 0
Content Analysis	______________	4 3 2 1 0
Contextual Mapping	______________	4 3 2 1 0
Contingency Management	______________	4 3 2 1 0
Contract Plan	______________	4 3 2 1 0
Cost-Benefit Analysis	______________	4 3 2 1 0
Criterion Referenced Measurement	______________	4 3 2 1 0
Critical Incidents Technique	______________	4 3 2 1 0
Critical Path Method (CPM)	______________	4 3 2 1 0
Dale's Cone	______________	4 3 2 1 0
Decision Tables	______________	4 3 2 1 0
Delphi Technique	______________	4 3 2 1 0
Discovery Technique	______________	4 3 2 1 0
Discrepancy Evaluation	______________	4 3 2 1 0
Distance Teaching & Learning	______________	4 3 2 1 0
Dynamic Programming	______________	4 3 2 1 0
Ethnography	______________	4 3 2 1 0
Fault Tree Analysis	______________	4 3 2 1 0
Feedback	______________	4 3 2 1 0
Field Test	______________	4 3 2 1 0

Field Experts' Validation Package (continued)

FIRO - B	________	4 3 2 1 0
Flowcharting	________	4 3 2 1 0
Force-Field Analysis	________	4 3 2 1 0
Formative Evaluation	________	4 3 2 1 0
Function Analysis	________	4 3 2 1 0
Futures Wheel	________	4 3 2 1 0
Gagne's Taxonomy	________	4 3 2 1 0
Galileo System	________	4 3 2 1 0
Gaming	________	4 3 2 1 0
Gannt Chart	________	4 3 2 1 0
Immediate Feedback	________	4 3 2 1 0
In-Basket Technique	________	4 3 2 1 0
Information Mapping	________	4 3 2 1 0
Interaction Matrix	________	4 3 2 1 0
Interaction Net	________	4 3 2 1 0
Interactive Television	________	4 3 2 1 0
Interface Analysis	________	4 3 2 1 0
Interpersonal Recall (IPR)	________	4 3 2 1 0
Involvement Matrix	________	4 3 2 1 0
Interviewing Users	________	4 3 2 1 0
Johnson-Neyman Technique	________	4 3 2 1 0
Krathwohl's Taxonomy	________	4 3 2 1 0
Latent Image	________	4 3 2 1 0
Learner Verification and Revision (LVR)	________	4 3 2 1 0

Field Experts' Validation Package (continued)

Least-Preferred Coworker	____________	4 3 2 1 0
Likert Scale	____________	4 3 2 1 0
Linear Programming	____________	4 3 2 1 0
Literature Search	____________	4 3 2 1 0
Log Diary	____________	4 3 2 1 0
Long-Range Planning	____________	4 3 2 1 0
Management by Objectives	____________	4 3 2 1 0
Managerial Grid	____________	4 3 2 1 0
Mathetics	____________	4 3 2 1 0
Matrix Sampling	____________	4 3 2 1 0
Merit Rating Chart	____________	4 3 2 1 0
Micro Teaching	____________	4 3 2 1 0
Monte Carlo Method of Analysis	____________	4 3 2 1 0
Morphological Charts	____________	4 3 2 1 0
Multidimensional Scaling	____________	4 3 2 1 0
Multi-Image/Multi-Media Presentation	____________	4 3 2 1 0
Needs Assessment	____________	4 3 2 1 0
Network Analysis	____________	4 3 2 1 0
Nominal Group Process	____________	4 3 2 1 0
Observation Interview	____________	4 3 2 1 0
Organization Chart	____________	4 3 2 1 0
Pair-Associate Learning	____________	4 3 2 1 0
Participative Management	____________	4 3 2 1 0
Path Analysis	____________	4 3 2 1 0

Field Experts' Validation Package (continued)

Personal Inverted Filing System (PIFS)	________	4 3 2 1 0
Program Evaluation Review Technique (PERT)	________	4 3 2 1 0
Program Planning Budgeting System (PPBS)	________	4 3 2 1 0
Questionnaire	________	4 3 2 1 0
Q-Sort	________	4 3 2 1 0
Relational Control Analysis	________	4 3 2 1 0
Relevance Trees	________	4 3 2 1 0
Role Playing	________	4 3 2 1 0
Semantic Differential	________	4 3 2 1 0
Sensitivity Training	________	4 3 2 1 0
Sequencing of Objectives	________	4 3 2 1 0
Shaping	________	4 3 2 1 0
Simulation	________	4 3 2 1 0
Stake Model	________	4 3 2 1 0
Standardized Tests	________	4 3 2 1 0
Story Boarding	________	4 3 2 1 0
Summative Evaluation	________	4 3 2 1 0
Synectics	________	4 3 2 1 0
Systemic Testing	________	4 3 2 1 0
System Transformation	________	4 3 2 1 0
Task Analysis	________	4 3 2 1 0
Technical Conference	________	4 3 2 1 0

Field Experts' Validation Package (continued)

Telelecture	________________	4 3 2 1 0
Trialogue	________________	4 3 2 1 0
Visual Inconsistencies	________________	4 3 2 1 0

Field Experts' Validation Package (continued)

ADDITIONAL TECHNIQUES FORM

The researcher recognizes that his list of 108 terms is by no means exhaustive. Hence, you are encouraged to add any technique(s) that you are aware of, which satisfies the criteria for such and which you feel merits a score of 2, 3, or 4 on our five-point scale. Please supply a suitable definition wherever possible.

Thank you.

Technique	Definition
1. ____________________	____________________
	____________________
	____________________
2. ____________________	____________________
	____________________
	____________________
3. ____________________	____________________
	____________________
	____________________
4. ____________________	____________________
	____________________
	____________________
5. ____________________	____________________
	____________________
	____________________

Field Experts' Validation Package (continued)

FIELD EXPERT FORM FOR SUGGESTIONS & COMMENTS

The validity of the researcher's survey instrument is dependent upon the sanction and approval of the panel of Field Experts. Therefore, you are encouraged to add any comments or suggestions for improvement that you deem necessary. If you have none, please check the appropriate box. Thank you.

☐ I approve of the survey instrument proposed by the researcher without reservations.

☐ I approve of the survey instrument, but would like to see the following modifications made:

(Use reverse side if necessary)

(signature)

APPENDIX G

Techniques According to Ranking by Field Experts

Technique	Ranking
Field Test	3.26
Brainstorming	3.17
Formative Evaluation	3.13
Needs Assessment	3.00
Feedback	2.96
Summative Evaluation	2.83
Task Analysis	2.78
Learner Verification & Revision (LVR)	2.65
Criterion Referenced Measurement	2.61
Story Boarding	2.57
Flowcharting	2.57
Interviewing Users	2.48
Bloom's Taxonomy	2.48
Observation Interview	2.43
Questionnaire	2.43
Critical Path Method (CPM)	2.43
Checklists	2.39
Literature Search	2.35
Sequencing of Objectives	2.26
Content Analysis	2.26
Simulation (see Gaming)	2.22
Cost-Benefit Analysis	2.17
Immediate Feedback (see Feedback)	2.17
Likert Scale	2.17

Techniques According to Ranking by Field Experts (continued)

Contract Plan	2.13
Management by Objectives (MBO)	2.13
Computer Search	2.09
Gaming	2.07
Program Eval. Review Tech. (PERT)	2.04
Technical Conference	2.04
Gannt Chart	2.04
Card Sort	2.04
Discovery Technique	2.00
Force-Field Analysis	2.00
Function Analysis	2.00
Shaping	2.00
Micro Teaching	2.00
Case Studies	1.96
Gagne's Taxonomy	1.96
Discrepancy Evaluation	1.87
Long-Range Planning	1.87
Cognitive Mapping	1.83
Nominal Group Process	1.78
Mathetics	1.78
Stake Model	1.78
Role Playing	1.78
Standardized Tests	1.74
Computer Assisted Instruction	1.74
Decision Tables	1.74

Techniques According to Ranking by Field Experts (continued)

Critical Incidents Technique	1.74
Krathwohl's Taxonomy	1.70
Behavior Modelling	1.61
Delphi Technique	1.61
In-Basket Technique	1.61
Authoritative Opinion	1.61
Program Planning Budgeting System (PPBS)	1.57
Appraisal Interview	1.57
Linear Programming	1.57
Multi-Image/Multi-Media Presentation	1.57
Information Mapping	1.52
Analysis of Inter Connected Decision Areas	1.48
Morphological Charts	1.48
Interaction Matrix	1.48
Network Analysis	1.43
Interface Analysis	1.43
Involvement Matrix	1.39
Semantic Differential	1.39
Organization Chart	1.35
Fault-Tree Analysis	1.35
Q-Sort	1.35
Participative Management	1.30
Interpersonal Recall (IPR)	1.30
Broken Squares	1.26
Interactive Television	1.26

Techniques According to Ranking by Field Experts (continued)

Managerial Grid	1.26
Behaviorally Anchored Rating Scale	1.26
Matrix Sampling	1.22
Interaction Net	1.17
Log Diary	1.17
Pair-Associate Learning	1.17
Contingency Management	1.17
Galileo System	1.13
Path Analysis	1.13
Systemic Testing	1.09
Sensitivity Training	1.09
Contextual Mapping	1.09
Synectics	1.04
Multidimensional Scaling	1.04
Dale's Cone	1.00
Johnson-Neyman Technique	1.00
Ethnography	1.00
Distance Teaching and Learning	0.96
Compressed Speech	0.96
Latent Image	0.96
Merit Rating Chart	0.91
Visual Inconsistencies	0.91
Least Preferred Coworker	0.83
System Transformation	0.83
Monte Carlo Method of Analysis	0.78

Techniques According to Ranking by Field Experts (continued)

Trialogue	0.74
Telelecture	0.74
Alexander's Method for Determining Components	0.74
Futures Wheel	0.70
Relevance Trees	0.70
Dynamic Programming	0.65
Relational Control Analysis	0.61
FIRO - B	0.48
Personal Inverted Filing System (PIFS)	0.43

APPENDIX H

Final Survey Instrument

A Study to Identify Major Field Techniques and Utilization Levels by Canadian Instructional Developers

Thomas L. Bennett

As members of the Association for Media and Technology in Education in Canada, many of us are professionally involved with instructional development. Central to this field is the utilization of diverse techniques which have become rooted in education. Of these techniques, many were spawned by instructional developers, while others have been adopted by us from psychology, communications, business and industry, etc.

It is the purpose of the following study to investigate knowledge and application levels of a number of these major instructional development techniques, as they apply to the AMTEC membership. For this purpose, the researcher assembled a list of 108 such techniques, and subsequently surveyed a group of 30 field experts in Canada and abroad. The survey instrument revealed that of the original list, 60 techniques were deemed to be of sufficient value to be included in the final study. It is acknowledged that this list is by no means definitive: a large number of techniques were culled from the original list, which in itself was not exhaustive. However, with this limitation noted, let us proceed; let us make a beginning. The first rung must be mounted before the ladder is ascended.

The researcher would beg your indulgence to consider the present survey. You are respectfully asked to devote a half hour or so of your time and complete the following document that has been printed in the centre portion of this issue of *Media Message*. It may be detached easily and returned to the researcher in the enclosed, addressed, stamped envelope. Further, the following list of alphabetized techniques and their definitions have been included, which may remain with the journal. It is hoped that the accompanying references may be of service to you in your future endeavours.

In conclusion, an analysis of the data and a complete report of the survey will be published in a future issue of *Media Message;* however, strict observance of individual anonymity will be maintained. It is felt that the results will be of significant value to the membership of AMTEC, and for this reason the researcher would like to thank you for your consideration and kind assistance.

Techniques and Definitions

Appraisal Interview

A verbal communication between employee and management concerning the results of an employee appraisal, in order to encourage present behaviour, or to provide a warning for a behavioral change, or to simply provide information.

Kay, E. A Study of the performance appraisal interview. *New York management development and employee relations services.* New York: General Electric Company, March, 1962.

Norman, R.F. Three types of appraisal interview, *Personnel.* March, 1958.

Authoritative Opinion

Descriptive writing based upon the observations of experienced practitioners, or persons who have had direct contact with the environment they seek to describe or explain.

Davis, R.C. *The fundamentals of top management.* New York: Harper & Row, 1951.

Fayol, H. *Industrial and general administration.* International Management Institute, 1930.

Final Survey Instrument (continued)

Behavior Modelling
Technique to enable managers to improve their managerial abilities by imitating "models" who have mastered the requisite skills.

Bandura, A. *Principles of behavior modification.* New York: Holt, Rinehard & Winston, 1960.
Goldstein, A.P., & Sorcher, M. Changing managerial behavior by applied learning techniques. *Training and Development Journal,* 1973, 36-39.

Bloom's Taxonomy
Psychological model that describes the major categories within the cognitive domain: knowledge, comprehension application, analysis, synthesis, and evaluation. The taxonomy proceeds on the assumption that knowledge is ordered hierarchically, and it is assumed that the six main classes are sequential, moving from knowledge to evaluation.

Gronlund, Norman E. *Stating behavioral objectives for classroom instruction.* New York: Macmillan, 1970.
Hunt, D.E., & Sullivan, E.V. *Between psychology and education.* Hinsdale, Ill.: Dryden Press, 1974.

Brainstorming
Technique that enables a group of people to quickly produce many ideas without fear of criticism. Ideas are recorded first and evaluated afterwards.

Babach, W.J., & Barkelew, A.H. *The Babach-Barkelew brainstorming book.* Utica, Michigan: Synergy Group Inc., 1976.
Havelock, R.G. *The change agent's guide to innovation in education.* Englewood Cliffs, N.J.: Educational Technology Publication, April 1978.

Card Sort
Pack of cards, containing goal statements on each card, is sorted into stacks that have been assigned value points, in order to determine a ranking of goals based upon importance and implementation priorities.

Witkin, B.R. Needs assessment, kits, models and tools. *Educational Technology,* 1977, *17,* 5-18.

Case Studies
A technique involving a comprehensive study of an individual, institution, or situation; used to provide detailed information for purposes of appraisal and recommendations.

Schatzman, L., & Strauss, A. *Field research.* Englewood Cliffs, N.J.: Prentice-Hall Inc., 1973.

Checklists
Technique to enable designers to use knowledge of requirements that have been found to be relevant in similar situations by first preparing a list of questions that were determined to be important in similar situations and next asking some of all of these questions about the design that is to be evaluated.

Jones, J.C. *Design methods.* London: John Wiley & Sons, 1970.

Cognitive Mapping
A systematic procedure for visually indicating how a person approaches new knowledge (cognitive information) in terms of perception, memory, thinking, and problem solving, based on previous knowledge or rules for acquiring new knowledge based on rules derived in learning old knowledge.

Thorndike, R.L., & Hagan, E. *Measurement and evaluation.* New York: John Wiley & Sons, 1977.

Computer Assisted Instruction
Instructional technique in which the computer contains a stored instructional program designed to inform, guide, control, and test the student until a prescribed level of proficiency is reached.

Coulson, J.E. *Programmed learning and computer-based instruction.* New York: John Wiley & Sons, 1962.
Poirot, J.L., & Groves, D.N. *Computer science for the teacher.* Manchaca, Texas: Sterling Swift Publishing Co., 1976.

Computer Search
Computerized technique that enables the researcher to search thousands of articles in a short period of time by the use of key words or descriptors; e.g., literature search.

Thesarus of ERIC descriptors. New York: Macmillan Information. 1980.

Content Analysis
A procedure for identifying intellectual tasks including: the concepts involved in a competency, the relationships among the concepts, the behaviors performed using the concepts and relationships. (AECT definition)

Kerlinger, F.N. *Foundations of behavioral research.* New York: Holt, Rinehart & Winston, 1973.

Contract Plan
A written agreement between the student and teacher which lists a set of goals, skills, and assignments to be completed by the student within a reasonable time.

Haddock, T. Individual instruction through student contracts. *Arizona Teacher,* May 1967.

Cost-Benefit Analysis
A generic term for such techniques as zero based budgeting, cost effectiveness, cost evaluation, etc., which assist the decision-maker in making a comparison of alternative courses of action in terms of their costs and effectiveness in attaining some specific objectives.

Prest, A.R., & Turvey R. Cost-benefit analysis: a survey. *The Economic Journal,* 1965, *75,* 683-735.
Wilkinson, G.L. Cost evaluation of instructional strategies. *Communication Review,* 1973.

Criterion Referenced Measurement
Tests constructed to yield measurements that are directly interpretable in terms of specified performance standards.

Humbleton, R.K., & Gorth, W.P. *Criterion-referenced testing: issues and applications.* Amherst, Mass.: Amherst School of Educa-

Final Survey Instrument (continued)

tion, Sept. 1971. (ERIC Document Reproduction Service No. ED 60025)
Jones, J.W. *A study of the congruency of competencies and criterion-referenced measures.* Master's thesis from Mississippi State University, 1977. (ERIC Document Reproduction Service No. 142575).

Critical Incidents Technique
Technique to acquire information on specific behavior patterns of a subject by interviewing the subject's work supervisor in order to ascertain behavior patterns relating to the skills being studied.

Borg, W.R., & Meredith, D.C. *Educational research and introduction.* New York: David Mckay Co., 249-251.
Flanagan, J.C. The critical incident technique. *Psychological Bulletin,* 1954, *51,* 327-358.

Critical Path Method
Technique to aid researchers with the planning, scheduling, expediting and progress monitoring tasks involved in a specific project by diagramatically plotting work activities and events in sequence and determining the longest time needed to complete the project.

Collins, F.T. *Network planning and critical math scheduling.* New York: Know How Publications, 1965.

Decision Tables
Alternative to a flowchart for presenting the logic of a problem, wherein the table is a set of decision rules in which each rule identifies a set of conditions with its set of actions; it is divided vertically by *condition statements* and *action statements* and divided horizontally by *stubs* and *entries.*

Hussain, K.M. Development of information systems for education. Englewood Cliffs, N.J.: Prentice-Hall Inc., 1973.

Delphi Technique
A futurist research method which utilizes the systematic solicitation and combination of informed judgments from a group of experts on questions or issues relevant to the future.

Helmer, O. *Analysis of the future: the Delphi method.* Santa Monica, Ca.: The Rand Corporation, 1967.
Melmer, O., & Dalkey, N.C. An experimental application of the Delphi method of the use of experts. *Management Science,* 1963, *9,* 458-467.
Weaver, W.T. The Delphi forecasting method. *Phi Beta Kappan,* January, 1971.

Discovery Technique
Learning model by which the student problem solves through discovering a new method rather than relying upon prior knowledge and procedures.

Taba, H. Learning by discovery. *Elementary School Journal,* 1963, *63*(6), 308-316.
Travers, R.M.W. (Ed.), *Second handbook of research on teaching,* Chicago: Rand McNally, 1973.

Discrepancy Evaluation
A method of identifying the causes of the difference between stated objectives and actual performance. (AECT definition)

Stake, R.E. Objectives, priorities, and other judgment data. *Review of Educational Research,* 1970, *70,* 181-212.

Feedback
Generative term that encompasses a number of techniques (including programmed texts, pull-tab response cards, Latent Image, etc.), which gives the learner an immediate response as to the correctness of his answers. It may also refer to data collected by researchers for purposes of evaluation.

Glaser, R., & Cooley, W.W. Instrumentation for teaching and instructional management. In R. Travers (Ed.), *Second handbook of research on teaching.* Chicago: Rand McNally, 1973.

Field Test
The assessment of a near-final model in an appropriate situation, according to specified criteria, for the purpose of determining what modifications of structure and performance are necessary (AECT definition).

Klausmeier, H. Research and development toward the improvement of education. *Journal of Experimental Education,* 1968, *37,* 146-156.

Flowcharting
Graphic representation for the definition, analysis, or solution of a problem in which symbols are used to represent operations, data, flow, and equipment, etc.

Chapin, N. Flowcharting with ANSI standards: a tutorial. *Computing Surveys,* June, 1970, *2.*
Enrick, N.L. *Effective graphic communication.* New York: Averback Publishers, 1972.
Schiber, T.J. *Fundamentals of flowcharting.* New York: J. Wiley & Son, 1969.

Force-Field Analysis
Graphic method of analyzing the forces providing thrust towards or facilitating change, and the forces hindering change in a particular situation.

Lewin, K. Frontiers in group dynamics: concept, method and reality in social science. *Human Relations,* 1947, *1.*
Giammato, M.C. Suggested activities for learning about role behaviors, problem solving and force field techniques. *Northwest Regional Education Laboratory.*

Formative Evaluation
An attempt to collect appropriate evidence during the construction and trying out of a new curriculum, etc. in such a way that revision of it can be based on this evidence; evaluation of instructional programs while they are still in some stage of development.

Anderson, S.B., Ball, S., & Murphy, R.T. *Encyclopedia of educational evaluating.* San Francisco: Jossey-Bass, 1975.
Bloom, B.S., Hasting, J.T., & Madaus, G.F. *Handbook on formative and summative evaluation of student learning.* New York: McGraw-Hill, 1971.

Function Analysis
In the Roger Kaufman Model for Educational Systems Planning, the Function Analysis stage is the process for determining requirements and subfunctions for accomplishing all of the elements stated in the objectives and problem identification stage. It is concerned with identifying the *whats* that have to be accomplished

Final Survey Instrument (continued)

rather than the *hows*.

Kaufman, R.A. *Educational system planning*. Englewood Cliffs, N.J.: Prentice-Hall, 1972.

Gagne's Taxonomy
Cognitive learning theory described as a hierarchy of learning processes that become increasingly complex and which places more emphasis upon learning and less on the development aspect.

Hunt, D.E. & Sullivan, E.V. *Between psychology and education*. Hinsdale, Ill.: Dryden Press, 1974.

Gannt Chart
A means of graphically illustrating a production schedule; the horizontal axis is used to depict time, with activities, items, or personnel listed vertically in the left-hand column.

Dessler, G. *Management fundamentals: a framework*. Reston, Va.: Reston, 1977.
Longenecker, J.G. *Essentials of Management: a behavioral approach*. Columbus, Ohio: Charles Merrill, 1977.

In-Basket Technique
Technique to analyze a participant's decision-making abilities, managerial and problem-solving skills, whereby s/he receives a "situation" set up on a memo to which a considered response is compared to answers suggested by field experts.

French, W. *The personnel management process* (4th ed.). Boston: Houghton Mifflin, 1978.
Ward, L.B. The use of business problems. *Management Record*, 1960, *22*, 30-33.

Information Mapping
System of graphically presenting information on a series of pages in the form of COBOL: each page is broken with horizontal lines dividing chunks of information into definitions, examples, rules, etc.

Glaser, R. *Teaching research and education*. New York: John Wiley, 1965.
Horn, R.E. Information mapping: new tool to overcome the paper mountain. *Educational Technology*, 1974, *15*(5), 5-8.

Instructional Analysis Kit
Self-evaluation of instructional procedures as a vital step towards course improvement.

Donald, Janet G., & Penney, M. *Instructional analysis kit*. Montreal, Quebec: McGill Centre for Learning & Development, 1977.

Interviewing Users
Technique to elicit information that is known only to users of a product or system in question.

Jones, J.C. *Design methods*. London: John Wiley, 1970.

Krathwohl's Taxonomy
Psychological model that describes the major categories within the Affective Domain: receiving, responding, valuing, organizing, and characterizing by a value or value complex.

Gronlund, N.E. *Stating behavioral objectives for classroom instructions*. New York: Macmillan, 1970.

Learner Verification and Revision
Involves the concepts of evaluation, revision and decision to implement developed by Kenneth Komoski, and intended for use as an index of quality for educational materials; involves the tryout of a prototype educational product on the target audience to determine its weaknesses prior to revision.

Kandaswamy, S. Learner verification and revision: an experimental comparison of two methods. *A. V. Communication Review*, 1976, *24*, 316 - 328.
Stolovitch, H.D. The intermediate technology of learner verification and revision. *Educational Technology*, 1978, *18*, 13-17.

Likert Scale
To obtain summated ratings of information pertinent to affective variables, by responding to statements which are both favourable and unfavourable to the phenomenon under study; responses range on a scale of five (from "strongly agree" to "strongly disagree") and are thus analyzed to determine which items discriminate best between the high-scoring individuals and the low-scoring individuals.

Phillips, *Social research*. 1966.
Stanley & Hopkins. *Educational and psychological measurement and evaluation*.

Linear Programming
Program in which the sequence of information presented to the students is fixed so that all students are given the same stimuli in exactly the same sequence followed by testing, followed by new information; based upon the stimulus-response works of Pressy and Skinner.

Brown, J.V., Lewis, R.B., & Harceroad, F.F. *A V instruction media and methods*. New York: McGraw-Hill, 1969.
Hartley, J. Programmed instruction 1954-1974: a review. *Programmed Learning and Educational Technology*, 1974, *11*, 278-291.

Literature Search
To find published information that can favourably influence the designers' output and that can be obtained without unacceptable cost and delay.

Jones, J.C. *Design methods*. London: John Wiley, 1970.

Long-Range Planning
Methodology to develop an adaptive planning program consisting of "alternative future" general plans and derivative plans for the major components of the agency in question; methods range from establishing goals, through developing plans for each alternative future, through selecting one alternative future plan and developing monitoring and shifting procedures.

Chase, R.B., & Clark, D.C. Long range planning in school districts. *Educational Technology*, 1974, *4*, 32-36.
Salmon, R.D. Developing a long range planning system for higher education. *School and Community*, May 1971.

Management by Objectives
Process whereby the superior and subordinated managers of an

Final Survey Instrument (continued)

organization jointly identify its common goals, define each individual's major area of responsibility in terms of the results expected, and uses these measures as guides for operating the unit and assessing the contributions of each of its members.

Hollman, R.W. Applying MBO research to practice. *Human Resources Management,* Winter, 1976.
Stein, D.I. Objective management systems: two to five years after implementation *Personnel Journal,* 1975, *54,* 525-583.

Mathetics
Training system to determine what to teach, a basis for determining strategy decisions, and a detailed procedure for constructing a lesson; those goals are attained through a series of ten steps which include occupational analysis, task selection, task analysis, population analysis, etc.

Gilbert, T.F. Mathetics II: the description of teaching exercises. *Journal of Mathetics,* April 1962, *1.*
Gilbert, T.F. Mathetics: the technology of education: *Journal of Mathetics,* January 1962, *1.*

Micro Teaching
Practice which allows pre-service or in-service teachers to develop or improve skills in applying a particular teaching technique, whereby a lesson is planned which concerns a single, unique topic to be presented to a small group of students, in a small time frame.

Allen, D.W., & Pyan, K.A. *Microteaching.* Reading, Mass.: Addison-Wesley, 1967.
Sadker, M., & Sadker, D. Microteaching for affective skills. *The Elementary School Journal,* 1976, *76,* 90-99.

Multi-Image/Multi-Media Presentation
The integration of more than one medium in a complementary manner in a presentation or module of instruction.

Wittich, W.A., & Schuller, C.F. *Instructional technology, its nature and use.* New York: Harper & Row, 1973.

Needs Assessment
The process in which "real-world" data is collected from individuals and groups involved in a particular educational situation to determine the nature of the problem, to determine how the group involved (learners, implementers, community) value what exists (status quo), what should be (the ideal situation) and the discrepancy between what is and what should be, and to prioritize the problems and discrepancies.

Anderson, S.B., Ball, S, & Murphy, R.T. *Encylopedia of educational evaluation.* San Francisco: Jossey-Bass, 1975.
Witkin, B.R. Needs assessment, kits, models and tools. *Educational Technology,* 1977, *17,* 5-18.

Nominal Group Process
Method to generate and prioritize ideas regarding problem-solving, job performance improvement, etc., whereby each member of a study group generates ideas that are listed before the group, ranked, and valued (1-5), and finally prioritized.

Albanese, R. *Managing; toward accountability for performance.* Homewood, Ill.: Richard D. Irwin, 1978.
Delbecq, A.L., VandeVen, A.H. Nominal group techniques for involving clients and resource experts in program planning. *Academy of Management Proceedings,* 1970.

Observation Interview
Method to define a task, analyze a job, or perform needs assessment or evaluation, whereby the investigator observes and questions an interviewee at the work site while the practitioner performs the activities under investigation.

Anderson, S.B., Ball, S., & Murphy, R.T. *Encyclopedia of educational evaluation.* San Francisco: Jossey-Bass, 1975.
Bergman, A.B., Dassel, S.W., & Wedgwood, R.J. Time-motion study of practicing pediatricians. *Pediatrics,* 1966, *38,*254-263.

Programmed Instruction
A generic term referring to a technique of, and materials for instruction; the process of constructing sequences of instructional material in a way that maximizes the rate of acquisition and retention, and enhances the motivation of the student; instruction utilizing a workbook textbook, or a mechanical and/or electronic device programmed to help pupils attain a specified level of performance. (AECT definition)

Briggs, L.J. *Sequencing of instruction in relation to hierarchies of competence.* Pittsburgh: American Institutes for Research, 1968.
Briggs, L.J. *Handbook of procedures for the design of instruction.* Pittsburgh: American Institutes for Research, 1970.

Program Evaluation Review Technique
A systematic timetabling and programming technique developed to measure, monitor, and control the development and progress of a project or program, wherein a network of events and work activities is identified, including the *critical path* of the one which takes the longest time to complete.

Cook, D.L. *Program evaluation and review technique: applications in education.* Washington: U.S.H.E.W Office of Education, 1966, *17.*
Kohn, M. *Dynamic managing: principles, process, practice.* Melno Park, Calif.: Cummings, 1977.
Lott, D.R. *Basic systems analysis.* New York: Onfield Press, 1971.

Program Planning Budgeting System
A planning budgeting system in which resources are allocated according to specified project or program needs; it directly relates substantive planning to fiscal planning requiring a detailed operational plan to which costs are then assigned on a programmatic, rather than on a line item basis.

Kindred, A.R. *Data systems and management.* Englewood Cliffs, N.J.: Prentice-Hall, 1973.
Magaro, J.D. P.P.B.S.: a means towards accountability. *Audiovisual Instruction,* 1975, *20*(10), 10-12.

Questionnaire
Instrument for recording data ranging from sociological opinions and attitudes to psychological variables which include opinions, attitudes and behavior; technique to obtain responses and reactions from a large number of individuals who could not be interviewed personally within a short period of time without considerable expense.

Bloom, B.S., & Hastings, M. *Handbook on formative and summa-*

Final Survey Instrument (continued)

tive evaluation of student learning. New York: McGraw-Hill, 1971.
Kerlinger, F.N. *Foundations of behavioral research* (2nd ed.). New York: Holt, Rinehart & Winston, 1973.

Role Playing
Instructional technique involving a spontaneous portrayal or acting out of a situation, condition, or circumstance by selected members of a learning group who assume either overtly or in imagination, the part or function of another.

Cooper, J. Deception and role playing: "On telling the good guys from the bad guys." *American Psychologist,* August, 1976. *31,* 605-610.
Keller, C.W. Role playing and simulation in history classics. *The History Teacher,* 1975, *8*(4).

Sequencing of Objectives
Objectives are sequenced according to a number of different methods in order to facilitate learning.

Popham, W.J., & Baker, E.L. *Systematic instruction.* Englewood Cliffs, N.Y.: Prentice-Hall, 1970.
Posner, G.J., & Strike, K.A. A categorization scheme for principles of sequencing content. *Review of Educational Research,* 1976, *46*(4), 665-689.

Shaping
A method of successive approximation to teach humans and animals a new skill; it reinforces behaviors that approximate the final performance one wants the subject to perform by shaping the learner's behavior by rewarding him whenever he is successful in approximating the skill being taught.

Davis, A., & Yelon, S. *Learning systems design.* East Lansing, Michigan State University, 1976.

Simulation
A learning process which involves pupils as participants in role presentations and/or games simulating real-life situations or environments; a learning activity which makes the practice and materials as near as possible to the situation in which the learning will be applied.

Greenblat, C.S., & Duke, R. *Gaming — simulation: rationale, design and application.* New York: Halsted Press, 1975.
Spannaus, T.W. What is simulation? *Audiovisual Instruction,* 1978, *23*(7), 16-17.

Stake Model
Technique intended for the evaluation of educational programs by providing data for decision-making; it provides measurements on a matrix of the match between what an educator intends to do and what s/he actually accomplishes.

Anderson, S.B., Ball, S., & Murphy, R.T. *Encyclopedia of educational evaluation.* San Francisco: Jossey-Bass, 1975.
Stake, R.E. *Evaluating the arts in education: a responsive approach.* Columbus: Charles Merrill, 1975.

Standardized Tests
An instrument constructed in accord with detailed specifications, in which the items have been selected after trying out for appropriateness in difficulty and discriminating power, one which is accompanied by a manual giving definite directions for uniform administration and scoring, and one which provides relevant and dependable norms for score interpretations.

Borg, W.R., & Gall, M.D. *Educational research* (2nd ed.). New York: David Mckay, 1971.
Buros, O.K. *The mental measurement yearbook.* Highland Park, N.J.: Gryphon, 1977.

Story Boarding
The activity of preparing a series of sketches or pictures and any accompanying text used to visualize each topic or item in an audiovisual material (or presentation) to be produced; usually used for planning.

Kemp, J.E. *Planning and producing audiovisual materials.* New York: Chandler Publishing, 1968.
Brown, L. *A.V. instruction, technology, media, and methods.* New York: McGraw-Hill, 1973.

Summative Evaluation
Evaluation intended to provide data for product validation and oriented to consumer-administration-teacher criteria and standards, used to assess the overall effectiveness of some program of material.

Anderson, S.B., Bull, S., & Murphy, R.T. *Encyclopedia of Educational evaluation.* San Francisco: Jossey-Bass, 1973.
Bloom, B.S., Hastings, T., & Mabaus, G.F. *Handbook on formative and summative evaluation of student learning.* New York: McGraw-Hill, 1971.

Task Analysis
The analysis and synthesis of a real world behavior and/or situation, including knowledge, skills and attitudes, including the following: a listing of the activities performed, an indication of the sequence and relationships among the knowledge, skills, and attitudes, the conditions under which the knowledge, skills and attitudes occur; and the acceptable criteria for knowledge, skills and attitudes performance.

Davis, I.K. Task analysis: some process and content concerns. *AVCR,* Spring, 1973, 73-83.
Gagne, R.M. *Task analysis — its relation to content analysis.* A paper presented at the annual meeting of the American Educational Research Association, Chicago: April, 1974.

Technical Conference
A group of high-level technical or subject matter experts are brought together to collectively determine the responsibilities and procedures of a set position.

Goldstein, I.I. *Training program development and evaluation.* Belmont, California: Wadsworth, 1974.
Segall, Asher, *et.al. Systematic course designed for the health fields.* New York: John Wiley, 1975.

Final Survey Instrument (continued)

Survey of Field Techniques Utilized by Canadian Instructional Developers

Anonymity and Confidentiality

All information you furnish will be held in strict confidence and reported in statistical aggregates only. No data which will link an individual to specific or general responses will be reported.

Directions

Filling out the questionnaire will require approximately 30 minutes of your time. Most questions can be answered simply by checking the appropriate box. In a few instances you will be requested to make brief written responses.

Please answer all questions whenever possible.

When you have finished, please detach survey forms and return in the enclosed, stamped envelope to:

Mr. Thomas Bennett
Site 3, R.R. 3
Parry Sound, Ontario P2A 2W9

1. Respondent's name (for clarification purposes only)

____

2. Years of teaching or educational work experience ____

3. Level of *highest* education (check one)

____ B.A./B.Ed./B.Sc.
____ Specialist or equivalent
____ M.A./M.Ed./M.Sc.
____ Ph.D./Ed.D.
____ College Diploma or
____ Other (specify)
____ Certificate (Specify diploma, institution, and Program description)

4. Name of University or College of your highest degree

____

5. Name of the program of your highest degree if you graduated with one of the degrees in No. 3 above (check one).

____ Adult Education
____ Applied Psychology
____ Computer Applications
____ Curriculum
____ Measurement and Evaluation
____ Educational Administration and/or Planning
____ Higher Education
____ History and/or Philosophy of Education
____ Instructional Development and Technology (Educational Media, etc.)
____ Sociology in Education
____ Special Education
____ Other (Specify)

6. State title or present job responsibility (check one)

____ Administrator
____ College Instructor
____ Curriculum Coordinator or Consultant
____ Remedial Teacher
____ Special Education
____ Audiovisual Technician
____ Librarian
____ Elementary School Teacher
____ Secondary School Teacher
____ University Professor/Instructor
____ Other (specify)

7. Institution/School Board in which you are currently employed.

(a) Approximate Enrollment ____________________
(b) Faculty Size ____________________
(c) Name of Institution/School Board (response is optional) ____________________

8. In order to identify your level of competency, level of usage, and how valuable you feel each technique is to Instructional Development, please check the appropriate box for each of categories A,B, and C.

Further, *if you are presently employed in a University, College, or Teacher Training Institution* that provides Instructional Development Programs and/or Teacher Training Programs, please indicate whether such programs teach the TECHNIQUE and to what DEGREE, by checking the appropriate box in category D.

Please Note: If you are NOT FAMILIAR with a technique, please check the Nil box in category A and *and go to the next technique;* do not proceed with Categories B through D.

Thank you for your help in completing this survey. Your efforts are greatly appreciated.

Technique Name	A. Competency Level				B. Level of Use				C. Value to Instructional Development				D. Degree to Which Institution Teaches			
	Nil	Hi	Med	Lo	Hi	Med	Lo	None	Hi	Med	Lo	None	Hi	Med	Lo	N/A
Appraisal Interview																
Authoritative Opinion																
Behaviour Modelling																
Bloom's Taxonomy																
Brainstorming																

Final Survey Instrument (continued)

Card Sort																
Case Studies																
Checklists																
Cognitive Mapping																
Computer Assisted Instruct.																
Computer Search																
Content Analysis																
Contract Plan																
Cost-Benefit Analysis																
Criterion Referenced Measurement																
Critical Incidents Technique																
Critical Path Method (CPM)																
Decision Tables																
Delphi Technique																
Discovery Technique																
Discrepancy Evaluation																
Feedback																
Field Test																
Flowcharting																
Force-Field Analysis																
Formative Evaluation																
Function Analysis																
Gagne's Taxonomy																
Gannt Chart																
In-Basket Technique																
Information Mapping																
Instructional Analysis Kit																
Interviewing Users																
Krathwohl's Taxonomy																
Learner Verification and Revision																
Likert Scale																
Linear Programming																
Literature Search																
Long-Range Planning																
Management by Objectives																
Mathetics																
Micro Teaching																
Multi-Image/Multi-Media Presentation																
Needs Assessment																
Nominal Group Process																
Observation Interview (eg. Time-Motion Studies																
Programmed Instruction																
Program Evaluation Review Technique																
Program Planning Budgeting System																
Questionnaire																
Role Playing																
Sequencing of Objectives																
Shaping																
Simulation (Gaming)																
Stake Model (Evaluation)																
Standardized Tests																
Story Boarding																
Summative Evaluation																
Task Analysis (Task Desc.)																
Technical Conference																

APPENDIX I

Initial List of Techniques

with ERIC Descriptors

+ = primary descriptors

* = techniques utilized in final survey, after adjudication by panel of field experts.

TECHNIQUE	ERIC DESCRIPTORS
ALEXANDER'S METHOD FOR DETERMINING COMPONENTS	1. Group Behavior / Dynamics 2. Intercommunication 3. Social Relations
ANALYSIS OF INTERCONNECTED DECISION AREAS (AIDA)	1. Administrative Evaluation 2. Course Evaluation 3. Curriculum Evaluation 4. Decision Making
* AUTHORITATIVE OPINION	1. Power Structure
* APPRAISAL INTERVIEW	1. Individual Tests 2. Performance Criteria 3. Performance Factors
* BEHAVIOR MODELLING	1. Behavior Patterns 2. Contingency Management 3. Process Education 4. Role Models
BEHAVIORALLY ANCHORED RATING SCALE	1. Affective Tests 2. Personality Assessment 3. Rating Scales
* BLOOM'S TAXONOMY	1. Educational Objectives 2. Management by Objectives 3. Measurement Goals 4. Needs Assessment
* BRAINSTORMING	1. Decision Making 2. Educational Innovation 3. Management Games 4. Management Systems 5. Problem Solving + 6. Teaching Techniques

Initial List of Techniques with ERIC Descriptors (cont'd)

BROKEN SQUARES	1. Game Theory 2. Management Games 3. Problem Solving 4. Simulation
* CARD SORT	1. Data Processing 2. Factor Analysis 3. Personality Assessment 4. Q-Sort + 5. Questionnaires
* CASE STUDIES	1. Case Records 2. Case Studies 3. Facility Case Studies 4. Longitudinal Studies
* CHECK LISTS	1. Administrative Evaluation 2. Case Records 3. Case Studies 4. Course Evaluation 5. Curriculum Evaluation
* COGNITIVE MAPPING	1. Cognitive Measurement 2. Cognitive Tests 3. Learning Plateaus 4. Psychometrics
COMPRESSED SPEECH	1. Information Theory 2. Language Research 3. Speech Compression +
* COMPUTER ASSISTED INSTRUCTION	1. Computer Assisted Instruction 2. Computer Oriented Programs 3. Man Machine System 4. Teaching Machines
* COMPUTER SEARCH	1. Data Processing 2. Information Processing 3. Programing
* CONTENT ANALYSIS	1. Content Analysis + 2. Course Content 3. Evaluation Methods 4. Item Analysis

Initial List of Techniques with ERIC Descriptors (cont'd)

CONTEXTUAL MAPPING	1. Decision Making 2. Multiple-Regression Analysis 3. Planning 4. Prediction + 5. Trend Analysis
CONTINGENCY MANAGEMENT	1. Behavior Chaining 2. Behavior Change 3. Contingency Management + 4. Individualized Instruction 5. Teaching Methods
* CONTRACT PLAN	1. Individualized Instruction 2. Open Education 3. Performanced Based Education 4. Tutorial Programs
* COST-BENEFIT ANALYSIS	1. Cost Effectiveness + 2. Program Budgeting 3. Program Effectiveness 4. Program Evaluation 5. Systems Analysis
* CRITERION REFERENCED MEASUREMENT	1. Criterion Referenced Tests + 2. Measurement Techniques 3. Norm Referenced Tests Mastery Learning +
* CRITICAL INCIDENTS TECHNIQUE	1. Critical Incidents Method + 2. Job Analysis 3. Measurement Techniques 4. Task Analysis
* CRITICAL PATH METHOD	1. Critical Path Method + 2. Cost Effectiveness 3. Management Systems 4. Program Evaluation 5. Scheduling
DALE'S CONE	1. Audiovisual Instruction 2. Concept Formation 3. Models 4. Multi-Media Instruction +

Initial List of Techniques with ERIC Descriptors (cont'd)

* DECISION TABLES	1. Data Processing + 2. Decision Making Skills 3. Management Systems 4. Problem Solving
* DELPHI TECHNIQUE	1. Decision Making 2. Futures 3. Prediction + 4. Social Change 5. Trend Analysis
* DISCOVERY TECHNIQUE	1. Discovery Process 2. Observational Learning 3. Open Education
* DISCREPANCY EVALUATION	1. Evaluation Criteria 2. Evaluation Methods + 3. Needs Assessment +
DISTANCE TEACHING & LEARNING	1. Correspondence Study + 2. Home Study 3. Independent Study 4. Part-time Students
DYNAMIC PROGRAMMING	1. Educational Research 2. Program Design 3. Program Development + 4. Program Planning +
ETHNOGRAPHY	1. Field Studies + 2. Learning Theories 3. Research
FAULT TREE ANALYSIS	1. Flow Charts + 2. Systems Analysis +
* FEEDBACK	1. Feedback + 2. Reinforcement 2. Program Instruction 1. Information Processing
* FIELD TEST	1. Field Studies + 2. Formative Evaluation + 3. Program Evaluation 4. Research Methodology

Initial List of Techniques with ERIC Descriptors (cont'd)

FIRO - B	1. Controlled Environment 2. Interpersonal Relationship 3. Self Actualization 4. Self Evaluation +
* FLOWCHARTING	1. Computer Programs 2. Flow Charts + 3. Graphs 4. Planning
* FORCE-FIELD ANALYSIS	1. Force-Field Analysis + 2. Interdesciplinary Approach 3. Research Methodology
* FORMATIVE EVALUATION	1. Curriculum Evaluation 2. Educational Improvement 3. Formative Evaluation + 4. Program Improvement 5. Summative Evaluation +
* FUNCTION ANALYSIS	1. Models 2. Needs Assessment + 3. Systems Analysis +
FUTURES WHEEL	1. Decision Making 2. Futures 3. Prediction + 4. Trend Analysis
* GAGNE'S TAXONOMY	1. Cognitive Processes 2. Information Processing 3. Learning + 4. Learning Characteristics 5. Sequential Learning +
GALILEO SYSTEM	1. Cluster Analysis + 2. Correlation + 3. Discriminant Analysis + 4. Factor Analysis 5. Intervals + 6. Linear Programming
GAMING	1. Game Theory 2. Role Playing + 3. Simulation + 4. Socio-Drama

Initial List of Techniques with ERIC Descriptors (cont'd)

* GANNT CHART	1. PERT + 2. Program Planning 3. Scheduling +
IMMEDIATE FEEDBACK	1. Feedback + 2. Information Processing 3. Programmed Instruction
* IN-BASKET TECHNIQUE	1. Leadership Training 2. Management Education + 3. Role Playing + 4. Simulation + 5. Supervisory Training
* INFORMATION MAPPING	1. Computer-Assisted Instruction 2. Instructional Design
* INTERACTION MATRIX	1. Decision Making 2. Instructional Design 3. Matrices 4. Relevance 5. Systems Analysis +
* INTERACTION NET	1. Decision Making 2. Instructional Design 3. Matrices 4. Relevance 5. Systems Analysis
INTERACTIVE TELEVISION	1. Educational Television 2. Man Machine Systems 3. Teaching Machines 4. Television +
INTERFACE ANALYSIS	1. Information Networks 2. Input Output 3. Intercommunication 4. Management Systems 5. Systems Analysis +
INTERPERSONAL RECALL	1. Recall Ratio 2. Relevance (information retrieval) 3. Relevance Ratio 4. Search Strategies 5. Systems Analysis +

Initial List of Techniques with ERIC Descriptors (cont'd)

INVOLVEMENT MATRIX	1. Decision Making + 2. Decision Making Skills 3. Management Games 4. Problem Solving
* INTERVIEWING USERS	1. Accountability 2. Case Records 3. Case Studies 4. Evaluation Methods 5. Feedback + 6. Item Sampling +
JOHNSON-NEYMAN TECHNIQUE	1. Group Behavior 2. Group Dynamics + 3. Group Structure
* KRATHWOHL'S TAXONOMY	1. Information Processing 2. Learning + 3. Learning Characteristics 4. Psychometrics
LATENT IMAGE	1. Feedback + 2. Information Processing 3. Knowledge of Results 4. Programmed Instruction Reinforcement
* LEARNER VERIFICATION & REVISION	1. Pre-Testing + 2. Pretests 3. Test Construction 4. Testing
LEAST-PREFERRED COWORKER	1. Contingency Management + 2. Leadership Training + 3. Management Development 4. Management Education 5. Supervisory Methods & Training
* LIKERT SCALE	1. Course Evaluation 2. Curriculum Evaluation 3. Student Evaluation 4. Summative Evaluation +
* LINEAR PROGRAMMING	1. Branching 2. Computers 3. Matrices 4. Operations Research

Initial List of Techniques with ERIC Descriptors (cont'd)

* LITERATURE SEARCH	1. Data Processing 2. Information Processing 3. Retrieval
LOG DIARY	1. Evaluation Methods 2. Needs Assessment + 3. Objectives 4. Planning 5. Systems Analysis
* LONG-RANGE PLANNING	1. Futures 2. Planning 3. Program Design 4. Systems Analysis +
* MANAGEMENT BY OBJECTIVES	1. Accountability 2. Educational Accountability 3. Management by Objectives + 4. Management by Systems
MANAGERIAL GRID	1. Conflict Resolution + 2. Decision Making 3. Group Relations 4. Interpersonal Competence 5. Problem Solving
* MATHETICS	1. Curriculum Design 2. Curriculum Development + 3. Industrial Education + 4. Industrial Training 5. Planning
MATRIX SAMPLING	1. Item Banks 2. Item Sampling + 3. Measurement Techniques
MERIT RATING CHART	1. Achievement Rating 2. Evaluation 3. Job Skills 4. Merit Rating Programs
* MICRO TEACHING	1. Micro Counseling 2. Micro Teaching +
MONTE CARLO METHOD OF ANALYSIS	1. Futures 2. Game Theory 3. Predictive Measurement 4. Probability Theory + 5. Trend Analysis +

Initial List of Techniques with ERIC Descriptors (cont'd)

MORPHOLOGICAL CHARTS	1. Decision Making 2. Instructional Design 3. Models 4. Needs Assessment + 5. Systems Analysis +
MULTIDIMENSIONAL SCALING	1. Cluster Analysis 2. Discriminant Analysis 3. Internal Scaling 4. Multidimensional Scaling +
* MULTI-IMAGE/MULTI-MEDIA PRESENTATION	1. Audiovisual Instruction 2. Instructional Media 3. Instructional Technology 4. Multi Media Instruction +
* NEEDS ASSESSMENT	1. Evaluation Methods 2. Needs Assessment + 3. Objectives 4. Planning Policy Formation 5. Systems Analysis
NETWORK ANALYSIS	1. Human Relations + 2. Interagency Co-ordination 3. Intercommunication 4. Interpersonal Relationships 5. Networks
* NOMINAL GROUP PROCESS	1. Decision Making + 2. Educational Innovation 3. Management Games 4. Management Systems 5. Problem Solving 6. Teaching Techniques
* OBSERVATION INTERVIEW	1. Affective Tests 2. Performance Appraisal 3. Personality Assessment 4. Rating Scales
ORGANIZATION CHART	1. Interagency Co-ordination 2. Intercommunication 3. Networks
PAIR-ASSOCIATE LEARNING	1. Associative Learning + 2. Pair Associate Learning 3. Transfer of Training +

Initial List of Techniques with ERIC Descriptors (cont'd)

PARTICIPATIVE MANAGEMENT	1. Decision Making + 2. Decision Making Skills 3. Management Games 4. Problem Solving
PATH ANALYSIS	1. Critical Path Method + 2. Sequential Approach 3. Systems Analysis
PERSONAL INVERTED FILING SYSTEM	1. Classification 2. Data Processing 3. Indexing 4. Information Processing 5. Information Storage
* PROGRAM EVALUATION REVIEW TECHNIQUE	1. Critical Path Method + 2. Fast Track Scheduling 3. Sequential Approach 4. Scheduling
* PROGRAM PLANNING BUDGETING SYSTEM	1. Cost Effectiveness Program 2. Money Management 3. Program Budgeting 4. Program Designs 5. Program Planning + 6. Program Costs
* QUESTIONNAIRE	1. Biographical Inventory 2. Data Sheets 3. Q-Sort 4. Questionnaires +
Q-SORT	1. Attitude Data Processing 2. Measurement Techniques 3. Personality Assessment 4. Q-Sort + 5. Questionnaires
RELATIONAL CONTROL ANALYSIS	1. Human Relations + 1. Interaction 2. Interagencies Co-ordination 3. Intercommunication

Initial List of Techniques with ERIC Descriptors (cont'd)

RELEVANCE TREES	1. Decision Making 2. Futures 3. Prediction + 4. Social Change 5. Trend Analysis
* ROLE PLAYING	1. Game Theory 2. Role Playing + 3. Simulation + 4. Sociodrama 5. Stimulators
SEMANTIC DIFFERENTIAL	1. Measurement Technique 2. Personality Tests 3. Rating Scales 4. Samantic Differential +
SENSITIVITY TRAINING	1. Group Therapy 2. Humanistic Education 3. Interaction Process 4. Sensitivity Training + 5. Training Group Discussion
* SEQUENCING OF OBJECTIVES	1. Critical Path Method + 2. Program Designs 3. Program Planning + 4. Scheduling 5. Sequential Approach
* SHAPING	1. Learning Theories 2. Positive Reinforcement 3. Reinforcement +
* SIMULATION/GAMING	1. Dramatic Play 2. Role Playing + 3. Simulated Environment 4. Simulation + 5. Socio-Drama +
* STAKE MODEL	1. Course Evaluation 2. Curriculum Evaluation 3. Educational Assessment 4. Evaluation + 5. Formative Evaluation 6. Summative Evaluation; Synthesis

Initial List of Techniques with ERIC Descriptors (cont'd)

* STANDARDIZED TESTS	1. Criterion Referenced Tests 2. National Competency Tests 3. Objective Tests 4. Referenced Tests 5. Standardized Tests +
* STORY BOARDING	1. Dramatics 2. Playwriting + 3. Scripts 4. Sequential Approach 5. Teaching Technique
* SUMMATIVE EVALUATION	1. Administrative Evaluation 2. Course Evaluation 3. Curriculum Evaluation 4. Program Evaluation 5. Program Validation 6. Summative Evaluation +
SYNECTICS	1. Behavior Chaining 2. Behavior Patterns 3. Information Theory 4. Problem Solving 5. Thought Processes 6. Transfer of Training +
SYSTEMIC TESTING	1. Behavior Change 2. Change Strategies 3. Social Change 4. Systems Analysis
SYSTEM TRANSFORMATION	1. Change Strategies 2. Program Design 3. Program Planning + 4. Sequential Approach 5. Systems Analysis
* TASK ANALYSIS (TASK DESCRIPTION)	1. Job Analysis 2. Skill Analysis 3. Task Analysis + 4. Task Performance
* TECHNICAL CONFERENCE	1. Evaluation Methods 2. Job Analysis + 3. Skill Analysis 4. Task Analysis + 5. Task Performance 6. Thought Processes

Initial List of Techniques with ERIC Descriptors (cont'd)

TELELECTURE	1. Exceptional Child Education 2. Instructional Media 3. Telecourses + 4. Telephone Communication Systems 5. Telephone Instruction +
TRIALOGUE	1. Diffusion + 2. Educational Innovation 3. Innovation 4. Instructional Innovation 5. Multi-Media Instruction +
VISUAL INCONSISTENCIES	1. Administrative Evaluation 2. Concept Formation 3. Decision Making 4. Models 5. Stimulators 6. Systems Analysis +

APPENDIX J

Professional Journals & Cited Techniques

JOURNALS	TECHNIQUES
ACADEMY OF MANAGEMENT JOURNAL	Management by Objectives
ADMINISTRATIVE QUARTERLY	Brainstorming
AMERICAN PSYCHOLOGIST	Role Playing
ARIZONA TEACHER	Contract Plan
AUDIOVISUAL COMMUNICATIONS REVIEW	1. Cost Benefit Analysis 2. Learner Verification & Revision 3. Task Analysis/Task Description
AUDIOVISUAL INSTRUCTION	1. Learner Verification & Revision 2. Multi-Image/Multi-Media Presentation 3. Program Planning Budgeting System 4. Simulation/Gaming
ECONOMIC JOURNAL, THE	Cost Benefit Analysis
EDUCATIONAL COMMUNICATION & TECHNOLOGY JOURNAL	Simulation/Gaming
EDUCATIONAL PSYCHOLOGY	Task Analysis/ Task Description
EDUCATIONAL RESEARCHER	Discrepancy Evaluation
EDUCATIONAL TECHNOLOGY	1. Card Sort 2. Cost Benefit Analysis 3. Formative Evaluation 4. Learner Verification & Revision 5. Long-Range Planning 6. Needs Assessment 7. Simulation/Gaming
ELEMENTARY SCHOOL JOURNAL, THE	1. Discovery Technique 2. Micro Teaching

Professional Journals & Cited Techniques (continued)

FUTURES: THE JOURNAL OF FORECASTING & PLANNING	Delphi Technique
HISTORY TEACHER, THE	Role Playing
HUMAN RELATIONS	Force-Field Analysis
HUMAN RESOURCES MANAGEMENT	Management by Objectives
IMPROVING HUMAN PERFORMANCE QUARTERLY	Simulation/Gaming
JOURNAL OF AESTHETIC EDUCATION	Stake Model (Evaluation)
JOURNAL OF APPLIED PSYCHOLOGY	Brainstorming
JOURNAL OF CREATIVE BEHAVIOR	Delphi Technique
JOURNAL OF EXPERIMENTAL EDUCATION	Field Test
JOURNAL OF MATHETICS	Mathetics
JOURNAL OF RESEARCH AND DEVELOPMENT IN EDUCATION	Field Test
JOURNAL OF TEACHER EDUCATION	Critical-Incidents Technique
MANAGEMENT RECORD	In-Basket Technique
MANAGEMENT SCIENCE	Delphi Technique
NURSING RESEARCH	Observation Interview
OCCUPATIONAL PSYCHOLOGY	Task Analysis - Task Description
PEDIATRICS	Observation Interview
PERSONNEL ADMINISTRATION	Behaviour Modelling
PERSONNEL JOURNAL	1. Appraisal Interview (Appraisal) Interview 2. Management by Objectives

Professional Journals & Cited Techniques (continued)

PERSONNEL PSYCHOLOGY	Behaviour Modelling
PROGRAMMED LEARNING AND EDUCATIONAL TECHNOLOGY	Simulation/Gaming
PSYCHOLOGICAL BULLETIN	Critical-Incidents Technique
RESEARCH METHODS	Case Studies
REVIEW OF EDUCATIONAL RESEARCH	1. Discrepancy Evaluation 2. Sequencing (of Objectives)
REVIEW OF RESEARCH IN EDUCATION	Cognitive Mapping
TEACHERS COLLEGE REPORT	Stake Model (Evaluation)
TRAINING AND DEVELOPMENT JOURNAL	Behaviour Modelling
VIEWPOINTS	Formative Evaluation

APPENDIX K

FIELD EXPERT RESPONSE FORM

(Matching Techniques with Gentry's Management Framework Model)

TECHNIQUE NAME	FUNCTION LETTER	FUNCTION NAME
Appraisal Interview	____	________________
	____	________________
	____	________________
Authoritative Opinion	____	________________
	____	________________
	____	________________
Behavior Modelling	____	________________
	____	________________
	____	________________
Bloom's Taxonomy	____	________________
	____	________________
	____	________________
Brainstorming	____	________________
	____	________________
	____	________________
Case Studies	____	________________
	____	________________
	____	________________
Checklists	____	________________
	____	________________
	____	________________

Matching Techniques
with Gentry's Management Framework Model (continued)

Computer Assisted Instruction	____	________________
	____	________________
	____	________________
Computer Search	____	________________
	____	________________
	____	________________
Content Analysis	____	________________
	____	________________
	____	________________
Contract Plan	____	________________
	____	________________
	____	________________
Cost-Benefit Analysis	____	________________
	____	________________
	____	________________
Criterion Referenced Measurement	____	________________
	____	________________
	____	________________
Discovery Technique	____	________________
	____	________________
	____	________________
Feedback	____	________________
	____	________________
	____	________________

Matching Techniques
with Gentry's Management Framework Model (continued)

Field Test	____	________________
	____	________________
	____	________________
Flowcharting	____	________________
	____	________________
	____	________________
Formative Evaluation	____	________________
	____	________________
	____	________________
Gagne's Taxonomy	____	________________
	____	________________
	____	________________
Interviewing Users	____	________________
	____	________________
	____	________________
Learner Verification & Revision	____	________________
	____	________________
	____	________________
Likert Scale	____	________________
	____	________________
	____	________________
Literature Search	____	________________
	____	________________
	____	________________

Matching Techniques
with Gentry's Management Framework Model (continued)

Long Range Planning	____	____________
	____	____________
	____	____________
Management by Objectives	____	____________
	____	____________
	____	____________
Micro Teaching	____	____________
	____	____________
	____	____________
Multi-Image/Multi-Media Presentation	____	____________
	____	____________
	____	____________
Needs Assessment	____	____________
	____	____________
	____	____________
Program Evaluation Review Technique	____	____________
	____	____________
	____	____________
Programmed Instruction	____	____________
	____	____________
	____	____________
Program Planning Budgeting System	____	____________
	____	____________
	____	____________

Matching Techniques
with Gentry's Management Framework Model (continued)

Questionnaire	____	________________
	____	________________
	____	________________
Role Playing	____	________________
	____	________________
	____	________________
Sequencing of Objectives	____	________________
	____	________________
	____	________________
Simulation	____	________________
	____	________________
	____	________________
Standardized Tests	____	________________
	____	________________
	____	________________
Story Boarding	____	________________
	____	________________
	____	________________
Summative Evaluation	____	________________
	____	________________
	____	________________
Task Analysis	____	________________
	____	________________
	____	________________

Matching Techniques
with Gentry's Management Framework Model (continued)

Technical Conference	____	____________________
	____	____________________
	____	____________________