THE EFFECTS OF TWO TYPES OF FIELD BASED INSERVICE TRAINING PROGRAMS FOR TEACHERS AND TEACHER CONSULTANTS IMPLEMENTING AN OBJECTIVE BASED PHYSICAL EDUCATION SYSTEM (I CAN) WITH TRAINABLE MENTALLY IMPAIRED STUDENTS

By

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ABSTRACT

THE EFFECTS OF TWO TYPES OF FIELD BASED INSERVICE TRAINING PROGRAMS FOR TEACHERS AND TEACHER CONSULTANTS IMPLEMENTING AN OBJECTIVE BASED PHYSICAL EDUCATION SYSTEM (I CAN) WITH TRAINABLE MENTALLY IMPAIRED STUDENTS

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The purpose of this study was to determine the effects of a massed versus distributed inservice training approach for teachers and teacher consultants implementing an objective based instructional system (I CAN) with trainable mentally impaired (TMI) students, five to fourteen years of age. The subjects were special education teachers (N = 18) and teacher consultants (N = 13) charged with delivering physical education services to TMI students. Participants were given inservice training by a Field Service Unit staff member at one of five school based demonstration/training centers throughout Michigan. The sixteen week investigation consisted of the initial information-sharing phase with a concurrent implementation schedule. The massed training group was given their information over two consecutive six-hour days. The distributed group commenced training with a one day, six-hour session followed by two one-half day sessions spaced two and four weeks after the initial information session. Teachers and consultants were given identical schedules for their respective groups to guide their activities during the implementation phase of the sixteen week study.

The study was conducted using a quasi-experimental, two group, post-test design. Upon conclusion of the study, all participants completed a component mastery test covering the information given to them during the total program.

In addition, a Field Service Unit staff member assigned an implementation score for each of the teachers while they conducted a physical education class using the I CAN system with their TMI students.

A comparison of scores on the knowledge test was completed between the two training groups of participants. Implementation data were also compared between teachers trained under massed and distributed conditions. A correlation coefficient was calculated between a teacher's knowledge test score and their implementation score.

The study was based on a limited sample and therefore generalization is not to be extended beyond the scope of this investigation. The results suggest:

1) When considering knowledge acquisition and retention for teachers and teacher consultants both training formats were effective.

2) When considering teacher implementation scores, both groups (massed and distributed) were effective. It is suggested that either instructional format can be implemented in a field based setting with sufficient time constraints.

3) The significant differences that were found favored the distributed trained group of subjects.

4) A post-training telephone survey which was conducted

with all participants revealed a strong preference for field based training to include follow-up classroom support and use of field based demonstration training centers.

DEDICATION

To Nancy

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CHAPTER I

THE PROBLEM

Introduction

The responsibility for providing future physical education services to handicapped students will be fulfilled to a large extent by those professionals already employed by public school districts. The constant increase in teacher salaries during the preceding decade, coupled with the corresponding rise in the number of available classroom teachers and the decrease in available jobs, has resulted in a cessation of the migrant teacher syndrome. As a result of the current relatively stable nature of teacher retention patterns, it is safe to assume that the majority of educators, who will be charged ultimately with providing services in physical education to handicapped students, are already members of the educational system (Howe, 1973; McCarty, 1973). Given the stability of teacher job placement, the need is clear for contemporary inservice training that offers these teachers the opportunity for continued professional growth. This requirement is especially true when one considers P. L. 94-142; the Education for All Handicapped Children Act:

> 121a.382 Inservice training.
>
> . . . (f) Each annual program plan must:
>
> (1) Describe the process used in determining the inservice training needs of personnel engaged in the education of handicapped children;
>
> (2) Identify the areas in which training is needed (such as individualized education programs, non-discriminatory testing, least restrictive environment, procedural safeguards, and surrogate parents);
>
> (3) Specify the groups requiring training (such as special teachers, regular teachers, administrators, psychologists, speech language pathologists, audiologists, physical education teachers, therapeutic recreation specialists, physical therapists, occupational therapists, medical personnel, parents, volunteers, hearing officers, and surrogate parents);
>
> (4) Describe the content and nature of the training for each area under paragraph (f) (2) of this section;
>
> (5) Describe how the training will be provided in terms of (i) geographical scope (such as statewide, regional, or local), and (ii) staff training source (such as college and university staffs, state and local educational agency personnel, and non-agency personnel); . . .

The present state of the art in inservice education has been described by Davis (1971, p. 39) as "the slum of American education." Rubin (1971) attributes the failure of inservice education to three causes: (1) teacher professional growth is not taken seriously; (2) inservice education has been poorly managed; and (3) it lacks any systematic methodology. The latter reason can be interpreted to

include evaluation practices. At least one other survey documented the lack of scientific evaluation of school district inservice programs with regular class teachers (Edelfelt and Johnson, 1975). Moody (1974) concurs with Rubin and Davis by stating that research on inservice education is scarce and that most practices are reported in "hazy terms" or as local success stories, rather than in objective terms.

Not only is there a dearth of statistically valid research data in the traditional areas of inservice training, but reportings become even more limited when investigating the time distribution variable within inservice models. Most discussions of training schedules were limited to subjective commentary. Leaders in the field of inservice education have stated, "First, there is no inherent merit in a particular form, such as a workshop compared with a short institute, or with a series of sessions distributed throughout the year" (Taba, 1965, p. 468). Other authors have made several general remarks on the topic of time distribution (Bass and Vaughn, 1965). In general, distributed practice was preferential to a massed approach, especially with regard to motor learning tasks of adults. Distributed practice was less advantageous, however, when verbal learning and other complex skills were considered.

The problems pertaining to inservice that need investigation are many and varied (Rubin, 1978). No particular order of investigation is superior to another and topics

must be addressed whenever and wherever possible within the actual work setting. As a result, progress in the resolution of these problems will be gradual (Rubin, 1978).

In spite of the recognized lack of data concerning the effectiveness of various inservice approaches, several crucial needs have been determined by both the architects and consumers of inservice education. The requirement of a field-based (on the job) training program with follow-up sessions represents a primary need as expressed by teachers. Several authors feel that since student change occurs in the classroom, training should also be conducted in the field (Katz, 1974; Williams, 1976).

The onset of the 1970's witnessed a firm commitment by the United States Office of Education, Bureau of Education for the Handicapped (BEH), to develop curriculum materials for the mentally retarded. As a result of federal funding, four major curriculum projects were developed to offer replicable instructional materials for handicapped populations. The funds which were awarded by BEH to the Field Service Unit in Physical Education and Recreation for the Handicapped at Michigan State University, resulted in the production of the I CAN objective-based system with accompanying instructional resource materials (see Appendix A for a short description of the I CAN system and materials). The I CAN instructional system is the first set of replicable physical education materials designed specifically for mentally handicapped students. The primary emphasis in the

early stages of development was to focus on components developed for trainable mentally impaired students (hereafter referred to as TMI students) 5-14 years of age. Subsequent field testing and data gathering resulted in the validation and classification of the I CAN system as a physical education instructional demonstration program by the Michigan Department of Education.

The means to implement a replicable instructional system such as I CAN have been made possible by new advances in the field of instructional design and technology. The concepts that serve to undergird a replicable instructional program (Wessel, 1975) generally include the ensuing elements:

1. Goals developed from a philosophy and a body of knowledge which offer a basis for examining the contributions made to the quality of life by various types and amounts of physical movement.

2. Performance objectives succinctly stated in a hierarchy so as to operationalize the previously stated goals.

3. Student assessment procedures that relate directly to the stated objectives.

4. Strategies and content that offer instruction based on the stated objectives.

5. Content and procedures confirmed through formal program evaluation methods.

In response to the evident lack of programs in physical education for the handicapped, the United States Congress offered special attention to physical education as a direct

service area to be provided for all handicapped students covered under the auspices of PL94-142. This federal legislation, also known as the Education for All Handicapped Children Act of 1975, mandates a free appropriate public education for all handicapped students, three through eighteen years of age by September 1, 1978, and three through twenty-one years by September 1, 1980. This bill was signed into law by President Ford on November 29, 1975 and is currently extending and reshaping the basic constructs of special education in America.

Physical education was included in the definition of special education in the Federal Register of August 23, 1977, Part II:

> 121a.14 Special education.
>
> (a)(1) As used in this part, the term "special education" means specially designed instruction, at no cost to the parent, to meet the unique needs of a handicapped child, including classroom instruction, instruction in physical education, home instruction, and instruction in hospitals and institutions.

While PL94-142 offers a clear mandate regarding the right of handicapped students to take part in regular or specially designed physical education programs, this landmark federal legislation fails to state the nature of the required training needed by the professional who will actually deliver the physical education services to the handicapped students. As a result of the lack of specificity in the regulations for PL94-142, physical education inservice

training programs constructed to meet the requirements of the federal statutes must be amenable to implementation according to delivery system requirements of a given state.

When working with so called normal students, several researchers have reported that classroom teachers are able to deliver a physical education program, equal in quality to a program taught by a physical education specialist (Ross, 1960; Scott, 1967). Similar results were reported on selected primary motor skill objectives when comparing classroom-based teachers to physical education specialists on their ability to implement a systematic replicable approach to physical education with mentally handicapped students (Vogel, 1974; Wessel, 1977).

Systematic methodology in planning, implementing and evaluating the effectiveness of inservice training is needed if teachers are to implement replicable programs as intended by their developers. Locating such systematic procedures, however, offers the staff development personnel an arduous chore.

This study was an attempt to evaluate the effectiveness of two types of field based inservice programs to train personnel to replicate an objective based instructional system (I CAN).

Statement of the Problem

It was the purpose of this investigation to determine the effects of two modes of field-based inservice training

for teachers and teacher consultants implementing an objective based instructional system (I CAN) with Trainably Mentally Impaired (TMI) students five through fourteen years. The effects were measured by a knowledge test and a teacher implementation skills report. The investigation was designed to provide data about the following hypotheses:

1. There are no differences between the knowledge levels of participants (teachers and teacher consultants) trained under a massed field-based training schedule (two consecutive one-day sessions within a total sixteen week training program) and participants trained under a distributed field-based schedule (one day followed by two, one-half day sessions offered the second and fourth weeks of an identical sixteen week field-based training schedule).

2. There are no differences in the level of teacher implementation when trained under a sixteen week massed or distributed field-based training schedule with follow-up support by teacher consultants.

3. There are no correlations between the teachers' knowledge of the I CAN objective-based instructional system and their ability to implement the system as intended.

In addition, data were obtained from all participants in response to a post-training questionnaire concerning:

a. Inservice training needs;

b. A school-based demonstration/training center;

c. Follow-up support in the classroom;

d. The field-based implementation system in the

classroom.

Scope of the Study

The results of the research offers data on two modes of field-based inservice training for a period of sixteen weeks. The participants were eighteen teachers, one class per teacher, and thirteen teacher consultants charged with delivering physical education services to their trainable mentally impaired students in thirteen districts in Michigan. Each teacher agreed to implement five physical education objectives with their students during a period of sixteen weeks for a total of seventy minutes per week per class. Teacher consultants also agreed to implement a standardized follow-up schedule with their respective teachers. The initial instruction of the teachers and teacher consultants occured at five school-based demonstration/training sites located in Michigan (see Appendix B for site locations). Instruction was given by staff members of the Field Service Unit in Physical Education and Recreation for the Handicapped at Michigan State. Each trainer used identical instructional materials, audiovisual aids and time schedules for each training component. The knowledge level of all participants (teachers and teacher consultants) and the implementation skills of the teachers were measured at the end of the sixteen week training period. The relationship between a teacher's knowledge level and implementation skills was determined. Within one week of the completion of the sixteen

week training period, a post-training questionnaire was completed for each participant.

Limitations of the Study

There are several elements within this research study which preclude generalization beyond the population and conditions of this investigation.

1. Subjects were selected in accord with certain requirements which violated a completely random sampling procedure; i.e., only those who volunteered and only those who had received no prior training and had no prior knowledge of the I CAN objective-based instructional system were included.

2. Participants were not assigned to mass or distributed training sequences on a random basis. It was necessary to offer either massed or distributed training at any of the five school-based demonstration training sites used in this study.

3. It was necessary to use different trainers at different training sites. Although trainers did not participate equally in massed or distributed training, follow-up procedures were used to control variables of trainer-trainee interactions.

4. The knowledge skills test was not monitored by the Field Service Unit trainers during its completion by the participants. The instructions requested that participants refrain from use of notes or other materials. The procedures

were agreed upon by all participants.

5. The possible effects of teacher consultant-teacher interaction during the implementation phase of the study may be a confounding factor on the outcome of the study.

Definition of Terms

Component Mastery Test - This is a knowledge test measuring each participant's understanding of the five components of the I CAN implementation system (assessing, prescribing, teaching, evaluating, planning).

Field Based Training - An objective based, inservice teacher training program incorporating:

1. A school-based demonstration/training center for initial instruction;

2. Teachers implementing selected physical education program objectives at their school site over a sixteen week time schedule with a teacher consultant providing follow-up support in each teacher's class setting;

3. The use of self-monitor forms for teachers and teacher consultants that are keyed to the components of the teacher implementation model: assess, prescribe, teach, evaluate and plan.

Massed Training - That portion of the field based training program in which a total of twelve hours of instruction was completed in two consecutive days at the school-based demonstration/training site and in which the sixteen

week implementation schedule was completed at the teacher and teacher consultant's school site.

Distributed Training - That portion of the field based training program in which a total of twelve hours of training was completed in an initial six hour session, followed by two three-hour sessions given during the second and fourth week of the sixteen week implementation schedule completed at the teacher's and teacher consultant's school based demonstration/training center.

Field Service Unit Staff - Members of the Field Service Unit (FSU) in Physical Education and Recreation for the Handicapped at Michigan State University, who were trained and certified to conduct the I CAN inservice training program.

Inservice Training - That portion of an educator's training that occurs after the completion of a professional preparation program and concurrent with professional employment.

Objective-Based Instructional System - An instructional program which uses objectives to organize, plan, assess, prescribe and evaluate a program in terms of student learning gains.

Performance Objective - A statement of expected student motor skill behavior expressed in terms which describe an observable behavior that a student should be able to do upon completion of instruction.

Post-Training Questionnaire - An eleven item instrument created to determine participant response on the major

aspects of the study: need for training; use of the school-based demonstration/training centers; and follow-up support in the classroom.

School Site - The location or school where each teacher conducted the sixteen week implementation program with their students.

Special Education Teacher - An educator, certified in special education as a teacher of the mentally impaired, who delivers instruction in physical education.

Summative Status Report - An evaluation form consisting of nineteen items which was used to measure the degree of implementation of the I CAN system components by each teacher who received training in the study.

Teacher Consultant (TC) - A professional educator whose duties include the provision of inservice training to special education teachers of the mentally retarded in accord with the State of Michigan regulations.

School-Based Demonstration/Training Center - A center based day school program for trainable mentally impaired students using the I CAN system where the initial massed and distributed training sessions of the inservice program occurred.

Trainable Mentally Impaired (TMI) - A student, in accord with the State of Michigan regulations, classified by an educational planning and placement committee as moderately mentally retarded with:

a. a developmental rate approximately three to

four and one-half standard deviations below the mean, as determined through intellectual assessment.

b. a lack of development, primarily in the cognitive domain.

c. an unsatisfactory school performance not based on social, economic or cultural background.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

When reviewing information relevant to inservice education published during the past two decades, one is overwhelmed by the plethora of evaluative data generated by professional educators and others concerned with teacher education. The total concept of inservice training is identified as a concern in many areas of education.

Chapter Two is divided into two sections. Section one provides an overview of inservice constructs, history, various inservice needs and models, and research on inservice training. Section two is a review of pertinent research concerning the distribution of time as a factor in knowledge acquisition and retention. A summary is presented at the end of Chapter Two.

Inservice Training

The literature pertaining to inservice education offers one a broad yet shallow overview of the current status of post-graduate teacher training in the United States. Numerous areas of concern are addressed but little is resolved.

For the purposes of this section, the discussion will focus on: inservice constructs, inservice: a historical perspective, inservice needs and models, governing inservice education, and research and development.

Inservice Constructs

When we consider the likely sources of an educator's information about teaching, we must readily admit that the most prominent origin of that knowledge is the act of teaching. Educators are advanced on the district pay scale in accord with their years of teaching experience, implying that the act of teaching increases a teacher's skill and knowledge. Therefore, from one point of view, the experience of teaching offers a large contribution to inservice training (Jackson, 1971). In order to focus the definition of inservice sharper, one must be aware that there is no specific time when a person starts or ceases being a teacher. As a result there is no such person as the "consummate" teacher (Jackson, 1971).

As a concept, inservice education may well involve a measure of continuing education.

> As long as knowledge about education continues to increase and new techniques and devices are contrived, there will be something new for the teacher to learn regardless of his degree or years of experience. The continuum of preparation can therefore cover the teacher's entire career (Smith, 1969, p. 151).

Broudy (1978) has suggested that the typical

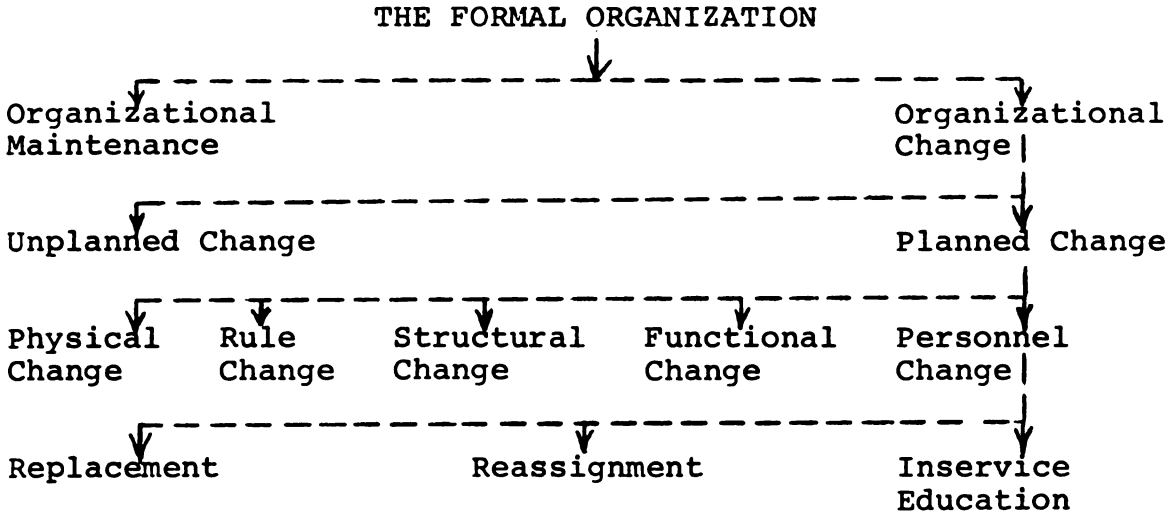
undergraduate teacher preparation program may be likened to the manufacture of automobiles where immediately after assembly, a trip to the mechanic is often required to make things right.

In order to develop a working definition of inservice education for this particular study, it was critical to limit the broad concept of inservice by differentiating programmatic staff development efforts from individual attempts at professional growth. The need for such individual growth is apparent; however, for the purpose of this study it is necessary to define inservice education as "planned activities for the instructional improvement of professional staff members."

As is the case with continuing education, the literature on inservice teacher education contains specialized terminology, some of which is used frequently and interchangeably when referring to inservice teacher education, namely; staff development, professional development, inservice education, inservice training, and growth inservice activity.

The purpose of inservice education is built upon a foundation of planned change which is implemented in an organizational context. As a result, planned change is put into effect through personnel development.

A schematic design of the conceptual framework for inservice education follows: (Harris and Bessent, 1969, p. 15)



Examining the diagram from the bottom up, inservice education may be defined as:

> ... the one means of instituting personnel growth, with personnel change one of several types of planned organization revision. Such alteration may be unplanned or planned, and a formal entity such as a school district may implement both maintenance and change functions. Other students of inservice education interpret its purpose as that of promoting the on-going improvement of all professionals of a school system. The teacher's perspective as to the purpose of perennial education is to remediate pre-service training shortcomings, advance teaching skills, and update the practitioner's subject matter knowledge. The mission of inservice education is carried to a logical conclusion when one considers the ultimate intent being to increase student learning through the alteration of teacher conduct (Harris and Bessent, 1969, pp. 16-17).

Inservice: A Historical Perspective

The following section traces the history of inservice education from its earliest days to our present times. By conducting an historical review of inservice education in

America, one is able to comprehend how inservice education evolved to its present status. A chronological survey of inservice education reflects the changes and growth of the teaching profession in the United States, and leads one to a critical review of current inservice education efforts.

As a result of several factors, an historical review of inservice education for teachers is somewhat difficult to pursue. Complications evolve as an outgrowth of the uneven development of inservice education among and within individual states. Such disparity must be recognized when one considers the power of each state to determine its own educational policy in meeting the needs of both rural and urban school districts.

Early accounts of inservice education described it as a method for providing basic skills to teachers who, in most cases, possessed something less than a college degree. With the arrival of the 1860's the inservice education concept embodied the principles of remedial education. Training was directed at educators who demonstrated an interest relevant to their professional knowledge and was done primarily to upgrade teacher competencies in teaching students reading, writing and numbers (Richey, 1957).

> During the period between the establishment of state systems of public education and the recovery from the effects of the Civil War, the public schools, as a whole, were staffed by probably the most indifferent, incompetent, and poorly educated teachers in the history of American education (Richey, 1957, p. 37).

The quality of education in America was in such a state of mediocrity that Moffitt (1965), cites Horace Mann's Sixth Annual Report (1843) as proclaiming that hundreds of public schools were terminated due to grossly incompetent teachers. The institutes or short courses of the 1860's through 1880's, were designed to bring a teacher's level of knowledge and tutelage skill to a position commensurate with general expectancies for teachers of that era.

Inservice education of the late nineteenth and early twentieth centuries was implemented during summer sessions at various state normal schools throughout America. These programs were much more cosmopolitan than the rural short courses implemented previously, and therefore they offered a more diverse faculty from which the teachers could choose.

Even though American education of the 1870's to the 1920's continued to stress the importance of content and class discipline, the ideas and philosophies of several progressive educators and scientists began to exert influence. Leading contemporary thinkers such as Charles Darwin and John Dewey made an obvious imprint on the more progressive outspoken teachers conducting the summer institutes. Frederick Burke of San Francisco Normal College dared to go so far as to lecture on the degree of individual student differences, and developed a plan in a demonstration school which included a curriculum and procedures for individualizing instruction. The essential purpose of these institutes and summer sessions was to offer teachers assistance in

dealing with such changes in education (Tyler, 1971).

The period between the end of World War I and the Great Depression produced early quantitative standards for teacher certification. The primary role of inservice education was to eliminate deficiencies in degree requirements for the many classroom teachers who did not possess an undergraduate degree. This pervasive movement forced college professors to offer old courses not previously taken by uncertified teachers rather than planning new progressive classes (Tyler, 1971).

The onset of America's Great Depression was accompanied by a sharp rise in school enrollments. This was particularly true at the secondary level where students who previously could leave school for a job no longer enjoyed an employment alternative. Some of these high school students had no interest in further education, and low morale was prevalent. This situation forced educators to re-examine their curricula and teaching procedures, and offer innovative approaches through inservice education of teachers.

The 1930's also witnessed a growth in the role colleges and universities assumed in implementing models of inservice education. An eight year study commenced in 1933 involved a working relationship between thirty local school districts and several universities with the intent to develop innovative educational programs. This proto-type of joint university-local school district involvement was duplicated on a regional basis in the southern United States and in

Michigan. The American Council on Education aided in the selection of the various universities, who in turn updated both preservice and inservice teacher education (Tyler, 1971).

The post World War II era witnessed another change in the function of inservice education in America. The rapid increase in the nation's live birthrate of the late 1940's resulted in a severe shortage of qualified teachers during the 1950's. This was particularly true at the elementary school level. The function of inservice education in the time of our country's acute teacher shortage was to serve as an expeditious method of certifying elementary level public school teachers. Short courses and workshops once again were offering knowledge in basic teaching methodology.

If the end of the 1960's saw a filling of teacher ranks in the United States, the early and middle years of the seventies witnessed a swelling of these once depleted ranks of professional educators. Once again, designers of inservice programs could turn away from remedial topics, and plan learning experiences for continual professional growth to fit the needs of educators in the field. Topics such as accountability, systematic approaches to education, and federal and state mandates for free appropriate public education for all handicapped students became major themes for current inservice education programs in the 1970's.

Contemporary inservice teacher education has been described by many consumers and producers as being in a state of turmoil and confusion. A closer inspection of the

current status of inservice education offers insight into several of the causes for the turmoil.

In its present form, inservice teacher education is implemented by a vast and complicated organization. Even though there is much dissatisfaction with inservice education and many non-professionals and professionals offer inservice education benign neglect, it does exist in an extensive form (Joyce, et al, 1976). Rubin (1971, pp. 245, 220) describes inservice "as having been a lost cause," and as having been a great void despite the notion "that teachers must continually upgrade skills." The lack of responsiveness to teacher change by universities and colleges is evident by the random manner in which inservice education has grown during the last fifty years. While the typical teacher has evolved from a person with minimal training to a fully certified professional, the aim of inservice is still in many cases one of remediation.

Teacher dissatisfaction concerning their inservice experiences may be based on several assumptions. While most teachers have been exposed to a variety of attempts to alter their attitudes or professional skills, many of these inservice offerings have not met the teachers' needs. Much of the inservice assistance has proven impractical, and the stimulus for attendance was instigated at the supervisory or authority level (Lippet and Fox, 1971).

The lack of expertise in implementing inservice education is evident in the attempts that have been made to

execute a large scale, coordinated inservice strategy. This failure results from a lack of commonality in teacher education programs coupled with numerous and diverse university and field based personnel serving as inservice providers (Fisher, 1971; Joyce, Howey, and Yarger, 1976). Attempts are being made, however, to provide funding for comprehensive development projects in inservice training for special and regular educational personnel by the Bureau of Education for the Handicapped. An example of this funding pattern is the Evaluation Training Consortium established at Western Michigan University to provide project directors with training in planning and implementing the evaluation strategies for training programs. A National Inservice Network (1979) has also been established to identify and disseminate effective practices in inservice education.

When comparing the present status of inservice education with the historical aspects, several generalizations can be offered. The remediation of certification shortcomings was given major attention in programming inservice education through the 1960's. In the 1970's, the major purpose for inservice education was focused on the dissemination of new and innovative educational programs (Tyler, 1971). The continued growth of inservice teacher education programs is clearly emerging for the 1980's as individual states implement full service programs for all handicapped children and youth.

Inservice Models and Needs

The various methods of presenting inservice programs form the basis for identifying contemporary needs of the producers of inservice education. As a result of numerous inservice experiences, those closely involved with both offering and receiving training have identified typical implementation models and their shortcomings.

Administrative approaches used by school districts to implement inservice programs may be subdivided into three major categories:

1. Centralized Approach - Inservice development is devised and administered from the central office.

2. Decentralized Approach - The central office assumes minimal control, and inservice is the responsibility of each school within the district.

3. Centrally Co-ordinated Approach - This design features minimal central office domination. Selection of topics and presenters is under the control of the individual schools, however, the central office staff completes the logistical arrangements (Asher, 1967).

The implementation of a standardized format as a problem solving approach is commonplace throughout the history of education. During the decade of the sixties, educational change was seen as a series of sequential steps progressing from abstract theory through research, development, diffusion, implementation, and evaluation. The teacher or teacher educator was generally considered a passive customer

(Atkins and Raths, 1978).

Within a few short years, it became apparent that change in education was not going to materialize as a result of applying the aforementioned format. Such a discrepancy may be documented when we consider the implementation of a standardized format in several non-educational areas. Pharmaceutical firms conduct research on various drugs. When medication is found to be effective, drug detail men carry the news to physicians in the field. The physicians try to match symptoms with treatment and effects as portrayed by the company detail people. Another example, the extension agent model, as used quite successfully in agriculture, also appeared attractive to educators during the 1960's. This information dissemination pattern entails a trouble shooting approach. Whereas drug detail men inform medical professionals about new medications, the farm extension agent produced a diagnosis and a prescription. The result of the extension agent's effort was measured in terms of crop production, while drug effectiveness was measured by patient response. Neither method measured up to expectations when used in an educational setting. The primary reason being that few educators can agree as to what observable criteria should be applied to measure success.

> For a variety of reasons, the methods do not seem to work well when applied to the field of education. The teacher does not seem to be interested in 'yield' in quite the same way as the farmer. Educational 'treatments' do not seem as reliable as therapeutic approaches in medicine. Some

> observers, in retrospective analysis, point out that incentive systems differ for teachers as compared with farmers or physicians. They point out, also, that teachers, in effect, have considerable latitude since the practice of one is not compared readily to the practice of another (Atkins and Raths, 1978, p. 229).

Despite the fact that numerous authors have offered the results of surveys supplemented with personal preference, no one inservice education model has emerged as superior. While several planners state the need for a continuity based program, Taba (1965) states there is no inherent merit in any particular form of presentation. The controversy concerning inservice models is further exemplified by the following reports. While McCracken (1968) favored a year-long approach, another survey of 754 teachers and inservice leaders resulted in a report terming protracted training as impractical (Ingersoll, 1975). While some educators have advocated various well-defined models, other professionals have reported attempts to implement a flexible inservice approach to meet the unique needs of individual teachers (Feaster and Nutter, 1977).

The previously discussed inservice methodologies reveal a conglomerate of approaches for the delivery of inservice education. The format for a contemporary inservice experience may range from personal interviews, single lectures, short weekend courses, televised or filmed presentations, to on-site practicums and hands-on experiences through an almost infinite variety of formats.

The great majority of the aforementioned inservice schemes are completely void of any objective criteria to substantiate their effectiveness (NEA Report, 1967; Monahan, 1970). A nationwide survey of 733 administrators and teachers was conducted by the National Education Association during 1967 to determine the current practices and trends in inservice education. For the purpose of this study, the most important finding concerning the present status of in-service was that nearly all training programs featured subjective evaluations. Therefore, a lack of statistical description was evident in most programs. In a similar study, an investigator reported that an evaluation was completed for more than seventy-five percent of the workshops surveyed (Asher, 1967). However, thirty-eight percent of these evaluations were oral reactions and another twenty percent were unsigned questionnaire responses.

The need to determine the success of teacher inservice education through a measure of instructor implementation has been documented (Brimm and Tollet, 1974). Furthermore, the observation of teacher behavior has been demonstrated as being an effective method of inservice evaluation (Overline, 1972).

The need for inservice planners to make a commitment to the writing of objectives has been documented (Tarr, 1969). A further conclusion is that a lack of written objectives results in the absence of workshop evaluation data (Monahan and Miller, 1970). Teacher participants also have expressed

the desire to have skills and materials presented that they can implement at once in their respective teaching situations (Turner, 1970). Similarly, other teacher participants have demonstrated a strong preference for such material to be presented at the local school level to include field based demonstration centers (Pane, 1973). It was also demonstrated that teachers need consultant services to provide follow-up assistance after inservice programs (Sobel, 1971; Feinburg, 1974). A similar need has been expressed by teachers involved in classroom based training which included long term follow-up (McCracken, 1968; Williams, 1976). Conversely, university staff members, as reported in one study, preferred that the inservice education take place on campus (Jaquith, 1973).

Governing Inservice Education

The governance system of inservice education has been described as the decision making framework which gives credibility to inservice and governs its activities (Joyce, Howey and Yarger, 1976).

The administration of inservice education, which was at one time the domain of central office administrators and university staff, has been decentralized. In contemporary education, inservice is subject to several forms and numerous levels of governance. When considering governance, we should be aware of three phases in the collaborative efforts of inservice teacher education: (1) the authority to create and maintain an inservice unit or center, (2) the authority to

govern a center, and (3) the governance of the individual teacher's relationship to a unit or center (Joyce, Howey and Yarger, 1976).

The federal government has assumed an increased support role for inservice education. Anyone familiar with PL 94-142, the Education for All Handicapped Children Act, is aware of the commitment made in that law for inservice education. When considering the federal mandates for a comprehensive system of personnel development to be in effect for all states, there is strong argument for the federal government assuming part of the financial burden.

State and federal governments play a similar role in the management of inservice education through financial support. Both levels of control have been active in many areas of teacher education for several decades. The future posture of the state government concerning inservice management is viewed by some educators as being more protrusive. Other educators view a conflict between the executive branch and the legislative arm of state government (Atkin, 1973). At least one other author is of the opinion that the state must allow local districts to carry out their own programs (Drummond, 1973).

The basis of an inservice network is built upon local financial support and control in conjunction with teacher needs. The role of the local district involving the duties and control of inservice education is in the midst of change. Such change is the result of teacher union demands and the

changing role of the school administrator.

Research and Development

The dearth of valid research, coupled with the extensive demands made on present inservice systems, results in the need for an expanded agenda for further investigation. The plight of contemporary inservice education is of such magnitude and intricacy that a definitive solution is extremely unlikely. Present conditions dictate the implementation of research and development techniques to upgrade the status of inservice education. A search of the pertinent literature for inservice education reveals a lack of meaningful data. This is particularly true for the time period prior to the early 1970's. The majority of research studies previous to 1970 focused on two topics: teacher opinions of inservice techniques and inservice practices of local school districts.

Several conclusions were stated in a study which was designed to determine the type of program which most nearly achieved the aims of inservice education in science (White, 1976). The following three programs were implemented: (1) a six credit hour graduate course taught on campus; (2) a one week pre-school year workshop combined with monthly follow-up visits; (3) a series of eleven one-half day workshops scheduled throughout the school year, with release time provided for all attendees. The investigator demonstrated that teacher attitude improves less than teacher knowledge, with the campus-based model producing the least effective change of the three formats tested. It also was demonstrated

that using the curriculum with students in a field-based setting was a positive factor in attitude formation. The pre-school year workshop was the preferred model for teacher improvement in the knowledge of science materials.

The results of a study designed to measure the effects of a simulation experience within an inservice program as it effects teacher assessment were reported by Kasden and Kelly (1969). The teachers (N = 93) were judged on their ability to select proper student reading levels. The teachers were assigned randomly to one of the following three groups: group one was given inservice training prior to the start of the school year; group two was given a series of five two-hour training sessions during the school year; and group three was the control group. After selecting one student from each teacher's class, the authors determined that any type of simulation training must be completed prior to the school year and before students are assigned to a reading group. This organizational structure may offer support to a massed training approach when using simulation activities. The feasibility of using a specific research design to evaluate teacher inservice training also was claimed.

Another investigator has reported that teachers are not only amenable to taking part in inservice research, but that they are not naturally resistant to innovative ideas, especially when given sufficient time to effect an educational change (Rubin, 1969). The timing of a particular inservice experience also must be considered (Vaughn, 1975).

Educational change can be implemented in the rather brief period of three weeks as reported by Scharles (1971). Twelve special education teachers in the Washington, D. C. area were trained in several affective content areas as well as in the knowledge of learning disabilities. The results of an analysis of variance measurement were calculated (α = .05) on a pre-workshop test, a post-workshop quiz, and a three month follow-up test. The investigator reported no significant gain in the affective areas under study, but significance was claimed for the cognitive knowledge of learning disabilities.

A study conducted under the auspices of the Florida Department of Education analyzed ninety-seven studies of continuing inservice teacher education (Lawrence, 1974). A result of the Florida study was a determination that those programs aimed at improving attitude were the least effective programs. The inservice offerings that stressed performance gains were the second most effective programs, and those programs which were knowledge-based were found to be the most effective. Lawrence (1974) is of the opinion that, as a result of past deficiencies, evaluation is the single most important component of contemporary inservice programming. Not only is evaluation critical for determining program success, but proper evaluation is needed to assess cost effectiveness. Calculating a cost effective factor provides a report of monies spent in relation to the generated product, thereby offering a justification for future

expenditures.

An exhaustive search of the inservice literature showed that relatively few of the more than 2,000 studies suggested any comprehensive guidelines (Nicholson, 1976).

> The majority of reports and articles are on the lowest level of generality; they are expository descriptions, usually uncritical of specific existing or completed inservice projects. Less frequent are works of a higher order of generality. These include surveys covering several projects; pieces of educational research; directories and guidebooks on reading, workshops, institutes, or consultants; catalogs of teacher training products; and proposed models on suggestions for future inservice. On the most rarified level are found the few works that attempt to deal with the subject of inservice teacher education as a whole: reviews of literature or research and a few other comprehensive studies (Nicholson, 1976, p. 24).

Numerous authorities have called for research beyond the questionnaire/survey stage of development; paradoxically these same leaders have apparently failed to produce the essential data. Three possible errors in judgment and planning that lead to the current status of inservice education are delineated (Turner, 1978):

> One, the substance of inservice programs has not always reflected the true concerns of teachers; two, the retraining activities have been excessively short-term, the evaluations of the activities have relied predominantly upon opinion, with little attention to tangible evidence of teacher growth, pupil achievement and undesirable side effects (Turner, 1978, pp. 262-263).

Massed Versus Distributed Practice: A Report of Relevant Research

The second section of the literature review is devoted to a discussion of research on massed and distributed practice for knowledge acquisition and retention. The material presented in this section is organized under the following topics: early research, reviewing, reminiscence, rehearsal, retention, repetition, interference and meaningful versus non-meaningful material.

Early Research

The issue as to which of the methods, massed or distributed practice, provides the greater learning environment has been debated and tested for centuries. Accounts of this controversy can be traced to the seventeenth century when Sir Francis Bacon (1620) alluded to the problem by stating: "If you read anything over twenty times you will not learn it by heart so easily as if you were to read it only ten, trying to repeat it between whiles, and when memory failed look at the book" (Bacon, 1620, p. 490).

However, the majority of the reported research in American education was conducted during the early part of the twentieth century. The research reports of this time frame share a common theme. As rigorous statistical techniques were unknown, data treatment and research design were less than robust. Despite this shortcoming concerning data analysis and research design, the importance of the early research is recognized. Therefore, a brief summation of

studies completed prior to 1925 serves to introduce this section of the review of literature.

The prototype for much of this early research is a study completed by Jost (1897). In this study, twelve essentially random lists of syllables were assembled, with six lists being assigned to distributed practice and six to massed learning. The twelve lists were learned with varying intervals over a seven day period by one subject. Seven differently arranged sets of the six distributed and six massed lists were learned over a five month period by the same subject. Within the limitations of a study with only one subject, and a high degree of list interference, the spaced method was reported as being superior to the massed method. A further note of interest concerning the Jost study was a control technique implemented by the experimenter to regulate fatigue. Jost ran a series of the syllable lists in which a number of repetitions of other non-related materials were completed by subjects in the distributed group. As a result, the total repetitions for each group or person were equal for each learning session. Jost reported that the distributed group persisted in its superiority over the massed group. The results obtained by Jost were confirmed in a study conducted on 203 undergraduate students engaged in the addition of mathematics problems (Reed, 1924).

An extensive study was completed to determine if results obtained for nonsense material agreed with results obtained for meaningful material (Austin, 1925). The author used

herself and five fellow faculty members and graduate students plus 185 undergraduate psychology students at the University of Michigan for subjects. All subjects studied material they were interested in, yet unfamiliar with. Faculty and graduate students participated for at least one year, and undergraduate student involvement lasted less than one year. All testing was completed in time spans ranging from two hours up to six weeks after the original study of the material as a test for immediate recall and retention. The first series of tests revealed that the distributed model was preferable to the massed model especially for periods of seven, ten and fourteen days of learning and practice. The distributed model was about as effective as the massed model for immediate recall. In a second series of experiments with the researcher and her five colleagues, Austin attempted to determine the effects on retention when testing was done after a comparatively long interval between learning and testing. Ten experiments were conducted with each of the six subjects. The massed study consisted of five repetitions in one day with the distributed practice involving one repetition per day for five days. Testing was conducted after one day, two weeks, and one month for a total of sixty tests. Each test used free recall and specific questions, and resulted in a high degree of consistency among subjects in their scores. The distributed scores were approximately three times higher than the massed scores on the free recall questions, but less than twice as high for the specific

questions. Forgetting occurred rapidly for both groups when they were tested up to two weeks after the learning occurred, then it leveled off for each model. Specific questions continually elicited more responses than free recall.

Another study which attempted to measure the effects of massed and distributed practice produced mixed results when using meaningful material (Gordon, 1925). In this research, 297 psychology students at the University of California, Los Angeles, were divided into four separate groups, with two assigned to each training regimen. The result of the study was that massed reading was superior for immediate recall, and spaced reading was superior for delayed recall.

Several other early researchers reported on the efficacy of the length of a learning task as a predictor of the superiority of either massed or distributed training. A study on the learning of nonsense syllables under massed and distributed practice was conducted by Lyon (1914). It was concluded that as the length of the list was increased, distributed practice produced an increasing advantage. In contrast to the results claimed by Lyon, a later study recommends the partitioning of longer units of learning, concommitantly increasing the advantage of massed learning over distributed learning (Pechstein, 1921). The author expressed the opinion that because connection of parts is more easily learned under massed conditions than under distributed conditions, such a method is more economical.

The studies cited in this section of the review are

representative of the available literature prior to 1925. They offer data leading to the early conclusion that the results of distributed learning usually exceeded those of massed learning when considering acquisition and retention of both meaningful and non-meaningful material.

The Effects of Reviewing

At least one attempt was reported in the literature of an effort to determine the relationship between the timing of a review and the administration of a test (Peterson, et al., 1935). Using a specially prepared six page piece of material, it was found that a reading review done seven days after the learning exercise was as effective as a reading review done two or three days after the original lesson. Data were gathered by administering retention tests to each group ten and twenty-one days after the original learning. Similar results were reported with reviews one and nine days after the original learning. This study concluded with the statement that the time interval between reviewing and testing for retention was not important.

The Effects of Reminiscence

The phenomenon of reminiscence has drawn the interest of numerous psychological investigators. Four studies of concern are reported herein. A study was completed on the effects of reminiscence, which was defined as the improvement in memory occurring after a specific time interval without a formal review or relearning of specified information

(McGeoch, 1937). Reminiscence occurs independent of intentional review in a free recall format. After studying 605 students, nine through eleven years of age, McGeoch concluded that reminiscence was much more prevalent than it was originally thought to be by most students of learning. McGeoch also determined that reminiscence is established independent of immediate recall, and that factors such as age, sex, intelligence, and familiarity with materials do not effect reminiscence in any predictable fashion. Clarification of the work completed by McGeoch is offered by Ward (1937). In this study, support was given to the theory that distributed practice and reminiscence were minimally discrepant. The two concepts became almost continuous in terms of experimental operations with the only difference being that a group under a distributed practice format received multiple interventions, with reminiscence involving a single rest interval. A similar, although weaker relationship, was reported by Underwood (1961). One other investigator conducted a study on reminiscence with nonsense syllables under massed and distributed learning conditions (Hovland, 1938). The reminiscence phenomenon was verified by having thirty-two subjects learn sixteen lists of syllables arranged in random order. The subjects who learned their lists under the distributed schedule were given a two minute rest between learning and relearning, while the massed format contained no intermission in the schedule. While recall and relearning were greater for the distributed group, pronounced

reminiscence was observed after massed practice. Hovland discounted fatigue as the cause of reminiscence because the total learning time was brief, and the rest period was only two minutes in duration. Several of the previously discussed studies lead this investigator to believe that reminiscence is a verifiable factor that tends to improve the scores of subjects trained under massed learning conditions.

The Effects of Rehearsal

Other researchers have offered advice for the control of rehearsal, a second concept which is inherent in a massed versus a distributed learning structure (Dore and Hilgard, 1928). Rehearsal may be considered as returning one or more times to the presented material for further study on a formal basis. The investigators advise that the control of rehearsal is maximized when all groups are given equal amounts of formal instruction time. It was rationalized that even if the number of learning periods is different between groups, rehearsal cannot be any more effective than direct instruction when the total instruction time is constant.

Other studies of rehearsal, as it affects learning, produced mixed results. One researcher concluded that a linear relationship exists between the amount of rehearsal and the magnitude of the test scores (Kimble, 1949). Conversely, other investigators have found an irregular relationship between rehearsal, rest periods and test scores (Hardy, 1930; Rohrer, 1949). As a result of the reported research, one can conclude that the effects of

rehearsal are mixed, with the distinct possibility that equal amounts of instructional time for massed and distributed groups will control this for variable.

The Effects of Retention

The various methods of determining information retention under learning models such as massed or distributed were discussed by Davis and Moore (1935). The following three methods of retention measurement were offered for consideration: (1) relearning, which involves learning material to the point of errorless reproduction, leaving the material, and then after a period of time, relearning the information to the level of original mastery; (2) recall, the amount of material produced by a given stimulus that is based on the original learning; (3) recognition, where relevant items are provided, and the subject must identify those which have been experienced personally. This article concluded by advocating that tests be devised to evaluate learning by using recall and recognition.

Several conclusions of interest concerning a longitudinal study on retention were reported by Bumstead (1940). While serving as the only subject between 1915 and 1935, Bumstead memorized 1,000 lines of Milton's Paradise Lost and 1,400 lines from the Bible. It was discovered that: (1) the longer the interval between readings, the shorter the study time needed and the longer the total elapsed learning time needed; (2) when a given passage is divided into portions to be learned concurrently, the smaller the parts, the shorter

the actual study time needed and the shorter the total elapsed learning time needed. The result of a later study failed to substantiate the advantage of using a distributed format over a massed approach (Underwood, 1961).

The Effects of Repetition

The effect of repetition and the spacing of reviews upon the retention of a complex and meaningful learning task was measured by Reynolds and Glaser (1964). The researchers implemented a programmed learning course using seventy-five junior high students. The program consisted of 11 forty-minute sessions and was offered via a teaching machine. Students were divided into massed or distributed training groups and were matched by intelligence and pre-test scores. Retention tests were administered two days later and again three weeks after the end of the instructional units. In all cases, the treatment groups scored significantly ($\alpha = .05$) higher than the non-treatment group. Administration of the second test saw no change in the superiority of the distributed training group over the massed training group. The study demonstrated that retention of meaningful data dissipates rapidly after two days, then levels off for periods up to three weeks' duration. The results of the reported data lead one to conclude that retention is more positively affected by training under a distributed training model versus a massed model.

The Effects of Interference

Another concept having a potential effect upon the study of massed and distributed practice is interference. Interference occurs when other material or learning is introduced after the text of interest has been presented to the subjects. At least one team of researchers demonstrated that as a general rule, the lower the meaningfulness of the material, the less the amount of response integration and therefore, the higher the susceptibility to learning interference (Wright and Taylor, 1949). A series of studies was conducted by Underwood (1961) to determine the range of materials and conditions which are facilitated by the distribution of practice. It was concluded that forgetting is accelerated by the distributed model as a result of increased interference. The evidence presented also suggests that the length of the interval between practices or trials is critical and generally results in poorer performance as time increases. Underwood found that reminiscence depended on the length of time interval but was of little importance to the amount of learning.

The Effects of Meaningful versus Non-Meaningful Material

An attempt was initiated by Tsas (1948) to determine the impact of the meaningfulness of the material as it applied to learning under a massed versus a distributed practice schedule. Twenty-four college level adults were used with each subject having ten trials per list of meaningful and non-meaningful material. The results showed that

both spaced and massed scores for the meaningful lists were superior to the spaced and massed scores on the low meaning list. Furthermore, the differences between the massed and distributed scores were greater for the low meaning lists than for the meaningful list. While the spaced practice proved more efficient than the massed practice for the low meaning material, there was little difference between spaced practice and massed practice scores in the high meaning material. A study of the effects of massed and distributed learning using meaningful filmed learning materials was conducted by Ash (1950). The research was conducted using a one-hour film with 400 undergraduate psychology students serving as subjects. Three classes of students were shown the movie in one session. Two other classes were shown the movie in two thirty-minute sessions shown on alternate days. A third group of two classes viewed the same movie in four fifteen-minute sessions on alternate days. Four classes who did not see the movie served as the control group. All classes were tested two weeks later on a seventy-eight item test. Ash found a significant difference (α = .05) in favor of the total experimental group, but no significance among the three experimental subgroups. It was concluded that training films up to one hour in length could be shown in a massed format and therefore reduce financial expense. The investigator also suggested the need for extending this type of study to more complicated and lengthy material. The studies

cited in this review do offer evidence that learning is enhanced by a subject's exposure to meaningful rather than non-meaningful material. However, no significant difference was reported when comparing the massed versus distributed format in learning such material.

The time span from the middle 1960's to the present day witnessed a variation in the emphasis placed on research on the distribution of time in learning activities. Investigators became more attuned to testing massed and distributed learning with meaningful material rather than prepared lists of nonsense syllables or random numbers. The more contemporary researchers also were able to avail themselves of more robust statistical analysis techniques. As an outgrowth of the aforementioned changes, more of the research on massed and distributed learning became less laboratory-centered and more field or classroom-based.

An example of a field-based study is one that was completed to determine the difference in achievement by nursing students (N = 100) who learned human anatomy and physiology material under massed or spaced conditions (Miller, 1967). Group A (N = 35) was given the material in sixteen weeks (massed group), while Group B (N = 75) learned the same amount of material in thirty-two weeks (distributed group). A pre-test showed no initial difference in knowledge between the two groups. A post-test found a significant difference (α = .001) in favor of the nursing students trained under the distributed system (32 weeks). The results

of the study reported by Miller were substantiated by Hilgard, Atkinson and Atkinson (1971).

An investigation which involved two parallel research studies was conducted to determine the effects of massed and distributed homework assignments on the achievement of ninth grade students in a first year algebra course (Butcher, 1975). The study also measured student preference of the instructional formats. A total of thirteen teachers taught one class under each instructional system. Achievement tests were administered after two chapters of study, and retention was measured after a third unit had been taught. Students were divided into low, middle and high intelligence groups. The results of the achievement test showed an overall superiority ($\alpha = .05$) for the distributed training group, with the low and middle intelligence groups being significantly superior to the massed training group ($\alpha = .058$ and $\alpha = .01$, respectively). The retention test showed no significant difference between the groups. The results of the questionnaire study indicated that the students favored the distributed model over the massed model ($\alpha = .05$). While Butcher claimed a significant difference between the massed and distributed models, a similar study resulted in different conclusions (Weaver, 1976). No significant differences ($\alpha = .05$) were found among the scores of 350 eighth grade students on selected mathematics concepts when trained by a massed or distributed format. The subjects were divided into low, middle and high intelligence groups

for achievement and retention tests. In a study using various methods of presentation, the efficacy of a self-instructional, multi-media module, was investigated by Braffet (1976). The study took place at Nichols State University and involved fifty-one undergraduate students in special education. A criterion test was administered to each group: massed, distributed and control. The test results showed a statistically significant difference ($\alpha = .05$) between control and experimental groups using the analysis of variance technique. However, there was no significant difference between the massed and distributed groups.

Summary

A study of the published literature pertaining to in-service training produces a wide range of topics with a meager amount of objective data to support findings and claims for improvement. Numerous problems are discussed, yet little data are offered in terms of resolution.

The review of literature in section one is an attempt to provide an indepth report on several important aspects of inservice training. While a study of the reported literature shows a basic weakness in that the methodology used to implement inservice training is outdated, this same literature also contains numerous promising practices for improvement. Several of those promising practices are presented here. The need is justified for field-based

inservice training programs to include visits to sites (demonstration centers) possessing effective ongoing educational programs. There is also a documented need for using field-based teacher consultants to serve as local trainers and follow-up personnel. Inservice programs that contain a classroom based follow-up component offer potential as a viable approach to the improvement of teacher training. Reports also stated that teachers can properly implement an innovative program when given an extended time frame for implementation, including classroom support. The use of student instructional material that was objective based and amenable to immediate implementation by teachers was discussed as a positive step. Another study offered evidence that inservice training programs which stressed gains in teacher cognitive knowledge were preferable to inservice programs aimed at improving teacher attitude. Furthermore, the use of an objective based system for teacher training programs shows promise. Another major point is that the measurement of teacher implementation of new materials may be an effective method for determining the success of an inservice program.

When considering massed versus distributed training for knowledge acquisition and retention, the literature search resulted in several findings of interest. The preponderance of evidence indicates that the introduction of time intervals between practice of learning sessions yields a greater amount of knowledge skills than the massed training format. However,

the reported research also demonstrated the lack of evidence to declare distributed practice as unequivocably superior, especially in regard to retention. As a result, the evidence presented must be considered somewhat inconsistent, particularly when other factors such as length or amount of material and type of subject are considered.

A review of the research on massed and distributed learning gives direction for studying one of the typical problems in inservice education. By applying a massed and distributed format to a teacher or consultant training program, one is able to measure learning in the practical setting. The data presented in section two of this chapter offer the necessary background on knowledge acquisition and retention for an application to inservice education.

The need to systematically develop, implement and evaluate different field-based inservice training models is obvious when we consider federal and state mandates concerning personnel preparation in special education. This need is even more apparent when we consider the current status of available objective data for inservice education.

The proposed study should add to the data base of research information useful in determining the feasibility of a field-based inservice training approach.

CHAPTER III

METHODS AND PROCEDURES

Purpose

The purpose of this study was to investigate the relative effects of a massed and a distributed sixteen week field-based inservice training program on the knowledge and implementation skills of participants using the I CAN objective-based physical education instructional system. The participants were teachers of the TMI and teacher consultants who provided consultant services to the TMI teachers. The following hypotheses were tested:

1. There are no significant differences ($\alpha = .05$) between knowledge levels of participants (teachers and teacher consultants) trained under a massed field-based training schedule (two consecutive one-day sessions within a total sixteen week training program) and participants trained under a distributed field-based schedule (one day followed by two, one half day sessions offered the second and fourth weeks of an identical sixteen week field based training schedule).

2. There are no significant differences ($\alpha = .05$) in the level of teacher implementation when trained under a sixteen week massed or distributed field based training

schedule with follow-up support by teacher consultants.

3. There are no significant correlations (α = .05) between a teacher's knowledge of the I CAN objective-based instructional system and their ability to implement the system as intended.

A post training questionnaire was also administered to all participants via telephone. The questionnaire dealt with the need for training, the use of a demonstration/training center, and the need for follow-up service.

Subjects

The subjects were professionals in special education who provided direct instructional service (N = 18) in physical education to TMI students, and/or consultative services (N = 13) in physical education for teachers. No participant had previous training with the I CAN system.

The teacher consultant was a logical selection to meet the expressed needs of special education personnel charged with delivering instruction in physical education to TMI students. Their responsibilities are defined according to State of Michigan Regulations. The recruitment of teacher consultants for this study was conducted through awareness presentations at two statewide consultant network meetings sponsored by the Michigan Department of Education Special Education Services Area. The selection of teacher consultants was based on three criteria. Each

consultant agreed to:

1. Select one or two teachers from their catchment area who were responsible for teaching physical education to TMI students.

2. Provide follow-up consultant service (site visits) to their teachers during the sixteen week implementation phase.

3. Complete all written requirements (see Appendix C).

The selection of teachers was based on the following requirements:

1. Teach the selected physical education program objectives, 70 minutes per week for sixteen weeks.
2. Participate in all training sessions.
3. Complete the implementation requirements as scheduled.
4. Complete all written requirements (see Appendix D).

As a result of geographical constraints, the random assignment of teachers and consultants to demonstration/ training centers was not feasible. The subjects used for the data collection represent a broad geographic base within the state. There is no reason to believe that similar professionals in Michigan would not perform in a like manner. Furthermore, the broad geographical spread of the participants' places of employment may have minimized the effects of local outbreaks of contagious illnesses and severe weather conditions typically affecting educators.

The sample used for the collection of data was composed of teacher consultants and teachers who volunteered for the

project. A brief demographic description of the sample follows:

Number of Consultants	13	Number of Teachers	18
Mean Age	45	Mean Age	27
Age Range:		Age Range:	
25-35 years	1	25-35 years	15
36-45 years	6	36-45 years	3
46 and older	6	46 and older	0
Years Teaching:		Years Teaching:	
Mean Years	13	Mean Years	4
1-3 years	1	1-3 years	9
4-7 years	0	4-7 years	7
8-11 years	2	8-11 years	1
over 11	11	over 11	1

Design of the Study

The specific plan of this study involved two independent variables:

A. Participant Type

1. Teacher of the TMI
2. Teacher Consultant in Special Education

B. Type of Field-Based Inservice Training Program

1. Massed Training
2. Distributed Training

The two types of inservice training were compared to determine their influence on the performance of the participants on a test of knowledge, required during the program. The implementation skills of the teacher participants was also compared by training format. A correlational analysis was conducted to determine the strength of the relationship between each teacher's knowledge test

score and their implementation skill as scored on a summative status report completed at the end of the sixteenth or seventeenth week of the training implementation period. The interaction effects between subject type and instructional mode also were tested. A post-training telephone questionnaire was conducted to measure participant reaction to the two types of field based training programs.

A schematic plan for data gathering and analysis appears below:

		M_1	M_2	M_3	M_4
Massed	Teacher	X	X	X	X
	Consultant	X			X
Distributed	Teacher	X	X	X	X
	Consultant	X			X

x = data generated or analyzed

M_1 = component mastery test (knowledge)

M_2 = summative status report (implementation)

M_3 = correlation between summative status score and component mastery test score

M_4 = post-training survey data

Description of Training Procedures

Each group was given a total of twelve hours of formal training in the implementation of the I CAN system. Training

was conducted under two types of inservice training, massed and distributed. Each participant was trained under one of the two following formats:

Massed Schedule	Distributed Schedule
two consecutive six hour days during the first week of the sixteen week training/implementation schedule	one six hour day during the first week, followed by two three-hour sessions spaced two weeks apart within the sixteen week training/implementation schedule

Figure 1 portrays the initial training sessions.

AGENDA

	Massed Training			Distributed Training			
	Day 1	Day 2	Total	Day 1	Day 2	Day 3	Total
Introduction	1/2 Hr.		1/2	1/2			1/2
Assessment	3 Hr.		3	2 1/2	1/2		3
Prescription	3/4 Hr.		3/4	1/2	1/4		3/4
Teaching and Reassessment	1 1/4	1 1/4	2 1/2	1	1 1/2		2 1/2
Assignment and Monitor Procedures	1/2 Hr.	1/2	1	1			1
Planning		3 1/4	3 1/4		1/2	2 3/4	3 1/4
Program Evaluation		1	1		1/2	1/2	1
	6	6	12	5 1/2	3 1/4	3 1/4	12

Figure 1. A specific time sequence for the initial training sessions.

Figure 2 depicts the total sixteen week training implementation schedule.

Weeks	Teacher	Consultant	Project Staff
0	Training Sessions	Training Session	Conduct Training
1	Overhand Throw		
2	Overhand Throw Training Session*	Training Session*	Conduct Training*
3	Self Monitor Form Overhand Throw Consultant Visit	Visit Teacher Self Monitor Form	
4	Run Training Session*	Training Session*	Conduct Training*
5	Run		
6	Run Self Monitor Form Consultant Visit	Visit Teacher Self Monitor Form	
7	Implement 10-week Plan		
8	Stamina Body Parts		
9	Consultant Visit Self Monitor Form	Visit Teacher Self Monitor Form	
10			
11	Directions in Space		
12	Consultant Visit Self Monitor Form	Visit Teacher Self Monitor Form	
13			
14			
15			
16	Component Mastery Test/Consultant-Field Service Unit Visit	Component Mastery Test/Monitor Teacher with Project Staff	Monitor Teacher Complete Summative Status Report

* For participants within distributed Training Format only.

Figure 2. Training follow-up schedule for massed and distributed training program.

All training was carried out at five selected I CAN school-based demonstration/training centers located in Michigan (see Appendix B for site locations). The inservice training program was delivered by three senior staff members from the Field Service Unit, each of whom used identical training materials and time schedules across all sites. Training at a specific demonstration/training center was conducted by one staff member. Each FSU trainer spent twelve hours at their respective site(s). Each site had a total of sixteen weeks from start to completion of the program.

Each of the three Field Service Unit trainers was qualified for, and designated as senior staff. In order to achieve this designation, a staff member was required to be involved directly in workshop preparation and implementation for a minimum of one year under the supervision of a designated senior staff member, and to be approved by the director of the FSU. The twelve hours of instruction were divided among the seven topics discussed during the workshops. FSU staff members were assigned to field sites based on several conditions. All of the trainers had developed professional relationships with the teaching staff at given demonstration centers prior to the commencement of this project. (See Appendix E for a description of the role of the school-based demonstration/training centers.) As a result of these on-going positive associations, several administrators requested specific FSU staff members to serve as the trainers for their sites. Other commitments within the FSU mandated the

specific staff assignments to the training sites. The effects of the aforestated logistical arrangement resulted in the following staff distribution:

Trainer I	Trainer II	Trainer III
1 Massed Site 1 Distributed Site	2 Massed Sites	1 Distributed Site

There are four content areas within the primary skills component of the I CAN system: Aquatics, Body Management, Fundamental Skills and Health Fitness. Although there are seventy-eight performance objectives within the four content areas, all subjects agreed to teach the following objectives to their TMI students for the duration of the project: overhand throw, run, heart-lung stamina, body parts and directions in space. By placing a restriction on the objectives taught, a level of standardization was maintained between all teachers and consultants concerning content taught during the training period (see Appendices D anc C for implementation schedules of teachers and consultants). Each teacher was required to meet with their consultant for a task-oriented session at least once every three weeks in addition to implementing the I CAN program as per the established schedule. Teachers and teacher consultants completed the self-monitor forms to task-orient each consultant session.

During the sixteenth week of the training/implementation schedule, the component mastery test was administered to all subjects. The test was written under closed book, no time

limit conditions. Since all participants in the training project volunteered for instruction, it was felt that the degree of self-motivation exhibited by each trainee made it possible to self-administer the test. Furthermore, the inability of the FSU staff to monitor all participants as they wrote the component mastery test made it necessary to assume that participants would adhere to the instructions requesting the non-use of aids when writing this test. The possibility of using a participant's fellow professional or supervisor to monitor the test was rejected as such a tactic diminishes the level of trust and empathy between trainer and participant.

Several variables were introduced into the testing situation in an attempt to alleviate the test anxiety of participants. No time limit was placed on the participants while they completed the test. Each participant was informed that the component mastery test was an attempt to measure inservice training program effectiveness rather than to make decisions about individuals involved in the project. See Appendix F for test directions given to all participants in the study.

The decision to adopt a closed book test format was a result of what the test items were designed to measure. As the component mastery test was designed to measure knowledge, the decision to use a closed book approach seemed most advantageous in determining overall mastery of the subject matter.

During the sixteenth or seventeenth week of the training/implementation schedule, a FSU staff member completed a summative status report on each teacher in the study. This was done while the teacher was using the I CAN system in teaching physical education to their class of TMI students.

General Approach

A quasi experimental design was employed in this study. The research method selected for this study is a modification of the equivalent materials design as described by Campbell and Stanley (1966) with the following notation:

one person	Sample A (0) X_0 0
or	
group	Sample B (0) X_0 0

Where (0) = optional pre-test, X = treatment, and 0 = post-test. The design for this particular study is depicted as follows:

x_1	o_1	o_3	r_1
x_2	o_2	o_4	r_2

Where:
- x_1 = treatment under massed instruction.
- x_2 = treatment under distributed instruction.
- o_1 = component mastery test score under massed instruction.
- o_2 = component mastery test score under distributed instruction.
- o_3 = summative status score under massed instruction.
- o_4 = summative status score under distributed instruction.

r_1 = correlation between component mastery test score and summative status score, massed group of teachers.
r_2 = correlation between component mastery test score and summative status score, distributed group of teachers.

Threats to Internal and External Validity

Campbell and Stanley (1966, p. 5) describe internal validity as "the basic minimum without which any experiment is uninterpretable...." Conversely, factors that are a threat to external validity if not controlled or minimized restrict the generalizability to other similar populations, settings and training programs. Only those elements that are of direct concern to this study shall be discussed in this section.

The following classes of extraneous variables are in need of discussion in relation to internal validity:

1. Selection Bias - All subjects were chosen on the basis of two criteria:

    a. A willingness and agreement to participate.

    b. No previous training with I CAN.

The selection method was identical for all subjects, therefore selection bias was minimized. As the training program was voluntary, the available sample had to be drawn from a population of subjects who expressed a desire to be trained.

2. Experimental Mortality - The selective loss of subjects during the project implementation should be considered as a possible confounding factor when interpreting the results of this study. Seven participants who attended

at least the first training session at their respective centers failed to complete the entire training program (four massed and three distributed). When considered in conjunction with the lack of random assignment to massed or distributed training, subject loss may be a confounding factor.

3. Selection Interaction - This variable has been minimized in all classes of internal invalidity except for selective mortality when considering the method of selection for each training group.

The following variable is explained in relation to external validity:

Interaction Effects of Selection Biases and Experimental Variable - While the author was admittedly unable to draw a random sample from the population, the sample from which data were gathered represents a wide geographic specimen of all consultants in special education and all teachers delivering physical education service to TMI students. Logistics dictated that all subjects be assigned to a training site most convenient to their place of employment. It also should be noted that each training site was designated as a massed or distributed model by a roll of the die; an even number on the roll indicating a massed training model and an odd number being a distributed site. The roll of the die was completed when three odd numbers were produced. Training bases also were distributed throughout Michigan to offer subjects a reasonable choice of a training site. Interaction of selection and the treatment does diminish the generalizability of the data to the restricted population of the study.

The design as implemented in this study offers control for many of the sources of internal and external invalidity. Given the circumstances, it is an appropriate model to use. However, it must be noted that the variables of experimental mortality and the interaction effects of selection biases should be mentioned as two known threats to design validity, which may serve to restrict the interpretation of the results of this research.

Instrumentation

The selection of an appropriate measurement instrument is a vital issue when planning studies which test the effects of a training program. In conducting research on the effects of a given training program, care must be taken to insure that the chosen measure of effectiveness is congruent with the objectives for the training program. This was not a characteristic of most of the research reviewed in Chapter Two of this study.

Component Mastery Test: Knowledge Skills

The degree to which the I CAN system was mastered by each subject was determined by a cognitive skills test (Appendix G) devised by the evaluation staff and the program development personnel at the FSU. Prior administration of the test to forty professionals in special education/physical education for the handicapped yielded a $r = .92$ when data were subjected to the Kuder-Richardson Formula 20 test for

reliability (Wessel, 1977). A similar reliability coefficient was calculated for the data in this study. Content validity has been demonstrated by a reporting matrix matching test items to the learning objectives of the instruction program. Refer to Appendix H for this matrix.

Summative Status Report: Implementation Skills

The summative status report consists of items measuring the classroom implementation skills of each participant for each component area (planning, assessing, prescribing, teaching and evaluating) of the I CAN system. The summative status report for each teacher was intended to reflect the level of classroom implementation for each component of the instructional system for a given lesson. The instrument contains nineteen items, of which seventeen are objective in nature (Wessel, 1977). The construction of objective type observation questions was done to reduce the degree of subjectivity among raters. See Appendix I for the summative status form. All questions could be answered Yes, No, or Not Applicable. A FSU consultant completed a summative status form while the teacher conducted a physical education lesson using the I CAN system.

Post Training Questionnaire

A questionnaire was developed by the author to ascertain the participants' reactions to their particular training regimens. Topical areas included in the questionnaire were: the value of going to a demonstration site for training, the

length of the total training program, appropriateness of the spacing of the training sessions and the use of field-based consultants. See Appendix J for the questionnaire. Results were tabulated on a percentage basis and reported by training model (Massed or Distributed).

Dependent Variables

The study was designed to provide data on several dependent measures of a comparative and descriptive nature.

1. Knowledge scores on a component mastery test were gathered from all participants. Scores were compared between teacher consultants and teachers trained on a massed versus a distributed training regimen. Scores were compared on the following five components of the I CAN system:

   a. assessing
   b. prescribing
   c. teaching
   d. evaluating
   e. planning

2. A summative status report was completed to measure the level of implementation skills for each teacher.

3. The strength of the relationship between a teacher's knowledge test score and their summative status score was determined through correlational analysis.

4. A post training questionnaire was conducted via telephone to determine each participant's level of satisfaction with the overall training and sixteen week implementation schedules they experienced.

Data Analysis

Experimental Unit

An experimental unit is defined as the smallest division of the experimental treatment such that any two units may receive differing treatments while a part of the experiment (Cox, 1966). For this study, the unit of analysis is the individual who participated in either massed or distributed training type over a total sixteen week training schedule.

Component Mastery Test: Knowledge Acquisition

The comparison of scores on the component mastery test was analyzed by Multivariate Analysis of Variance. The design was a participant by treatment type, two by two design ($\alpha = .05$). The total scores were analyzed by a two-way Analysis of Variance, and reported by percent correct.

Summative Status Report: Implementation Skills

As all questions on the summative status report can be answered Yes, No, or Not Applicable, data were converted to a percent of Yes scores. Questions answered Not Applicable were considered as non-responses. As with the component mastery test, the summative status form is divided into five parts. The data again were treated by Multivariate Analysis of Variance using treatment as the only independent variable ($\alpha = .05$).

Correlational Analysis: Teacher Implementation and Knowledge Skills

The strength of the relationship between teachers' mastery test scores and their summative status (implementation) scores were determined by a Pearson Product-Moment coefficient of correlation, (α = .05). A comparison was made between teachers trained under the massed or distributed training conditions.

Post-Training Questionnaire

Data from an 11-question phone survey were tabulated and presented by training model (massed versus distributed). Data were gathered concerning the participant's opinions on their training, the use of a school-based demonstration/ training center, and the need for follow-up. The percentage scores and frequency scores were calculated for each question.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

The purpose of this study was to determine the effects of two types (massed and distributed) of field based inservice training programs for teachers and teacher consultants delivering physical education services to TMI students in Michigan. The participants were trained to implement an objective based instructional system (I CAN) over a sixteen-week schedule.

The results of this study are presented in the order in which the three research hypotheses were tested. A general discussion of the results of this study, as they relate to the selected research reviewed, is provided at the end of this chapter. Refer to Appendix K for raw data.

Knowledge Test Scores: Component Mastery

HYPOTHESIS 1: There are no significant differences ($\alpha = .05$) between the knowledge levels of participants (teachers and teacher consultants) trained under a massed field-based training schedule (two consecutive one-day sessions within a total sixteen week training program) and

participants trained under a distributed field-based schedule (one day followed by two, one half-day sessions offered the second and fourth weeks of an identical sixteen-week field-based training schedule).

Total Test Score Results

The data generated on the total component mastery test scores were amenable to analysis by a two-way ANOVA model, training format by participant type. Table 1 contains the sample size, mean scores and standard deviations for each cell within the design.

Table 1: Descriptive statistics by training format and participant type for total component mastery test score.

	N		Mean Scores %			S.D.	
Format	Participant		Participant			Participant	
	Tch.	Cns.	Tch.	Cns.	Tot.	Tch.	Cns.
Mass	10	7	80.3	78.0	79	.35	.61
Dist	8	6	83.5	86.6	85	.48	.38

Total: N = 31

Tch.: Teacher; Tot.: Total; Cns.: Consultant; Mass: Massed; Dist: Distributed.

The mean percent (knowledge test) scores for all trainees for both training formats across participant type was relatively high, 79 percent for the massed group and 85 percent for the distributed group. The total score obtained by each group

exceeds the minimal 75 percent set by the FSU staff as necessary for minimal competence. It is suggested that in terms of total test score for the I CAN knowledge skills, both training formats are effective when providing inservice training for teachers or teacher consultants. Given the choice of either training format with teacher consultants, one might wish to consider the distributed approach as the difference in total score is greater for teacher consultants than for teachers. The fact that there was less discrepancy in total score among the massed and distributed training groups of teachers may be the result of their having to implement the system thereby mediating their scores. The Kuder-Richardson-20 test (Ebel, 1972) for reliability produced a coefficient of .82 for this test. The interaction and main effects are detailed in Table 2.

Table 2: The effects of training format and participant type on total component mastery test score.

Source	df	MS	F	Probability
Massed versus Distributed	1,29	87.325	1.954	.174
Teacher versus Consultant	1,29	1.505	.034	.856
Interaction	1	44.288	.991	.328
Error		44.691		

The interaction and main effects were found to be non-significant; as a result no further analysis was conducted.

Subtest Score Results

The data generated by the completion of the component mastery test are presented by participant type and by training format.

Sub-Test Results for Teachers by Training Schedule

The data generated by the administration of the component mastery test are presented in this section (for teachers) by training format. The descriptive data for the teacher's performance are found in Table 3.

Table 3: Descriptive statistics by training format for the teachers' component mastery test scores.

	Teachers					
	Massed			Distributed		
Subtest	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Assess	10	15.40	1.84	8	15.50	2.33
Prescribe	10	11.70	1.89	8	11.13	2.53
Teach	10	10.80	1.32	8	10.88	2.10
Evaluate	10	10.30	1.34	8	10.00	2.67
Plan	10	10.60	1.89	8	12.63	1.41

The data presented in Table 4 depicts the results of the one-way Multivariate Analysis of Variance with the five component (sub-test) scores as the dependent variables for teachers.

Table 4: Effect of training format upon the teachers' scores for the five subtests of the component mastery test.

Source	Dependent	MS	df	F	P
Treatment Type	Assess	.044		.01	.92
	Prescribe	.002		.00	.98
	Teach	.002	1	.00	.97
	Evaluate	.178		.04	.85
	Plan	11.74		4.71	.05
Error	Assess	4.28			
	Prescribe	5.86			
	Teach	2.74	16		
	Evaluate	4.48			
	Plan	2.49			

The Multivariate Analysis results show that there is a significant difference ($p = .05$) favoring the distributed group of teachers trained under the massed or distributed training format for planning only. There was no significant difference on the other four components.

Sub-Test Results for Teacher Consultants by Training Schedule

The data generated for the five components (subtests) of the component mastery test for teacher consultants were amenable to treatment by a one-way Multivariate Analysis of Variance using the subtest scores as the dependent variable. Table 5 is a presentation of the descriptive statistics for the teacher consultants.

Table 5: Descriptive statistics by training format for teacher consultants' component mastery test scores.

	Teacher Consultants					
	Mass			Distributed		
Subtest	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Assess	7	13.86	4.41	6	14.50	2.26
Prescribe	7	10.86	2.41	6	11.33	1.63
Teach	7	10.14	1.95	6	12.50	.04
Evaluate	7	9.43	1.99	6	11.33	1.03
Plan	7	11.86	1.77	6	12.67	1.51

The results of the Multivariate Analysis are presented in Table 6.

Table 6: Effect of training format upon the teacher consultants' scores for the five subtests of the component mastery test.

Source	Dependent Variable	MS	df	F	P
Treatment Type	Assess	1.33		.10	.75
	Prescribe	.73		.16	.69
	Teach	17.95	1	7.49	.02
	Evaluate	11.72		4.44	.06
	Plan	2.11		.77	.39
Error	Assess	12.94			
	Prescribe	4.38			
	Teach	2.39	11		
	Evaluate	2.64			
	Plan	2.74			

There is no significant difference for the components of assessing, prescribing, evaluating or planning. There is a significant difference ($p = .02$) in teaching in favor of teacher consultants trained under the distributed format.

Sub-Test Results for All Participants by Training Schedule

The following section is a presentation of the results of the Component Mastery Test for all participants by sub-test score. The descriptive statistics are presented in Table 7.

Table 7: Descriptive statistics by training format for component mastery subtest scores for all participants.

	All Participants					
	Mass			Distributed		
Subtest	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Assess	17	14.77	3.13	14	15.07	2.22
Prescribe	17	10.77	2.12	14	11.22	2.30
Teach	17	10.53	1.59	14	11.22	1.87
Evaluate	17	9.94	1.64	14	10.57	2.14
Plan	17	11.12	1.90	14	12.64	1.45

The data was amenable to a one-way Multivariate Analysis of Variance which is presented in Table 8.

Table 8: Effect of training format upon all participants' scores for the five subtests of the component mastery test.

Source	Dependent Variable	MS	df	F	P
Treatment Type	Assess	.72		.094	.762
	Prescribe	.149		.033	.856
	Teach	8.336	1	2.89	.100
	Evaluate	3.050		.847	.365
	Plan	17.86		6.24	.018
Error	Assess	7.724			
	Prescribe	4.472			
	Teach	2.885	29		
	Evaluate	3.599			
	Plan	2.861			

The Multivariate Analysis results show that there is significance with only the planning component ($p = .02$). This difference is in favor of the groups trained under a distributed format.

Discussion

In general, the results indicate that both types of field-based training are effective as measured by knowledge test scores for teachers or teacher consultants. When results are compared by training format and participant type, test scores tend to favor the distributed field-based training model. Significant differences favoring the distributed training format were found for teachers on program planning and for teacher consultants on teaching. For all participants there was a significant difference on the program

planning component. The significant difference for the planning component in favor of the distributed group of teachers may be the result of their need to implement the system with students before attempting to do long term program planning. During the information sharing portion of the sixteen-week study, the massed trained teachers received their planning information during the second day of training, while those trained under the distributed format were able to begin using the objectives with their TMI students prior to having to decide upon a program plan for their students. There was no difference for teacher consultants on planning as they did not actually implement a program plan with TMI students.

Other than the training program itself, no particular explanation is offered for the difference in teacher consultant scores for the teaching component of the knowledge skills test.

It would appear that the acquisition and retention of knowledge to implement a long-term, objective-based instructional program plan favored the distributed trained participants. This result may be due to two conditions: (1) the amount of knowledge required for developing the program plan within the two day format; and (2) the shorter time between the planning portion of the instructional program and the time the component mastery test was administered for the distributed format. Program planning was the final portion of the twelve hour informational sharing phase of the study.

Summative Status Score Results: Implementation Skills

HYPOTHESIS 2: There are no significant differences (α = .05) in the level of teacher implementation when trained under a sixteen week massed or distributed field based training schedule with follow-up support by teacher consultants.

The data obtained from the summative status report were based upon scores earned by teachers only, and therefore the data are amenable to treatment by a one-way multivariate analysis of variance. Teacher consultants did not have direct teaching responsibilities, and therefore a summative status report was not generated for them. The role of the teacher consultants was to perform regular follow-up field visits to assist teachers in the sixteen week implementation of the I CAN system.

Total Summative Status Score

Table 9 is a presentation of descriptive data by training group for a total summative status score.

Table 9: Descriptive data in percent score for all components of the summative status report by training format.

Massed			Distributed		
N	$\bar{X}$	SD	N	$\bar{X}$	SD
10	78%	.67	8	81%	.55

The descriptive data indicate that on the average both

groups of teachers achieved summative status (implementation) scores in excess of the 75 percent criterion needed for successful implementation.

The total score on the summative status report was treated by a one-way analysis of variance. The results are presented in Table 10.

Table 10: Effects of training format upon teachers' implementation score for all components of the summative status report.

Source	df	MS	F	Probability
Massed versus Distributed	1	.201	.243	.628
Error	16	.824		

The results of the one-way ANOVA are non-significant when comparing total scores on the summative status form for the massed and distributed training groups of teachers.

Component Summative Status Score

Table 11 is a presentation of descriptive data by training group and subtest for teachers' summative status scores.

Table 11: Descriptive data of the summative status scores for each component by training format.

	All Teachers					
	Massed			Distributed		
Subtest	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Assess	10	92%	.42	8	94%	.46
Prescribe	10	98%	.32	8	87%	.54
Teach	10	50%	.53	8	87%	.35
Evaluate	10	70%	.52	8	63%	.46
Plan	10	73%	1.73	8	72%	1.58

The results of the multivariate ANOVA for the component summative status scores are presented in Table 12 with the calculated error terms.

Table 12: The effects of training format upon teachers' summative status scores for each component.

Source	Dependent Variable	MS	df	F	P
Treatment Type	Assess	.011		.05	.81
	Prescribe	.711		3.92	.07
	Teach	.625	1	2.96	.11
	Evaluate	.100		.41	.53
	Plan	.100		.04	.85
Error	Assess	.19			
	Prescribe	.18			
	Teach	.21	16		
	Evaluate	.24			
	Plan	2.18			

There are no significant differences on summative status scores by component between teachers trained under a massed or distributed format.

Discussion

There was no significant difference in the implementation skills of teachers for any of the five components: assessing, prescribing, teaching, evaluating, and planning. When considering both groups of teachers, all participants who were assigned instructional responsibilities functioned at a level acceptable for proper implementation of the I CAN objective-based physical education instructional system. This was accomplished with the help of a teacher consultant using a structured, systematic implementation schedule with both teachers and teacher consultants using self-monitor forms for all consultation sessions. These forms were keyed to the five components of the implementation system.

The results of the data analysis for teacher implementation are generally in basic congruence with teacher component mastery test findings. The only significant difference for teachers on the knowledge skills test was in favor of the distributed group for program planning. When considering these results, one might suggest that the actual implementation of a program plan tends to mediate the differences in knowledge test scores. It should be noted that teacher consultant/teacher interaction was not totally controlled, and their interaction could have influenced the level of performance. However, given the fact that all teacher

consultants chose their own teacher(s) and visits were structured through teacher and teacher consultant self monitor forms, this variable may have been controlled.

Correlation Between Teachers' Component Mastery Test Score and Summative Status Report Score

HYPOTHESIS 3: There are no significant correlations ($\alpha = .05$) between the teachers' knowledge of the I CAN objective based instructional system and their ability to implement the system as intended.

The Pearson Product-Moment Correlation Coefficients between component mastery test scores and summative status scores are presented by type of training (massed versus distributed) for all teachers in the study. For the purposes of interpreting the correlation data, a moderate relationship will be defined as $\geq .39$ $[r_c] \leq .69$ and a high relationship as $[r_c] \geq .70$ (Heusner, 1976). The chosen alpha level for claiming significance is $\leq .05$.

Distributed Training Correlation

The data presented in Table 13 represent the correlations between the summative status scores and component mastery test scores for teachers (N = 8) trained under the distributed format. The Pearson Product-Moment Correlation Coefficients are presented by subcomponent of the I CAN implementation system. The top figures represent the correlation coefficients and the bottom figures are the calculated alpha values.

Table 13: Correlation coefficients between the summative status scores and component mastery test scores for teachers trained under the distributed format.

	SUMMATIVE STATUS REPORT					
	Assessing	Prescribing	Teaching	Evaluating	Planning	Total
COMPONENT MASTERY TEST						
Assessing	.8653* .003					
Prescribing		.6861* .030				
Teaching			.1683 .345			
Evaluating				.8442* .004		
Planning					.0481 .455	
Total						.8375* .005

* Significant, $\alpha \leq .05$.

There are significant correlations for assessing, prescribing, evaluating and total score.

Massed Training Correlations

The Pearson Product Moment Coefficients of correlation for the teachers (N = 10) trained under the massed schedule are presented in Table 14. The top figures in each cell are the correlation coefficients and the bottom figures are the calculated alpha values.

Table 14: Correlation coefficients between the summative status scores and component mastery test scores for teachers trained under the massed format.

SUMMATIVE STATUS REPORT

COMPONENT MASTERY TEST	Assessing/Prescribing/Teaching/Evaluating/Planning/Total
Assessing	.5449 .052
Prescribing	.5727* .042
Teaching	-.2461 .230
Evaluating	.4308 .107
Planning	.5806* .015
Total	.4600 .900

* Significant, $\alpha \leq .05$.

The results of the Pearson Product Moment Coefficient of Correlation Analysis reveal significant correlations for the prescribing and planning components.

Combined Training Group Correlations

The correlation coefficients between summative status scores and component mastery test scores for all teachers (N = 18) is presented in Table 15. The top figures represent the correlation coefficients and the bottom figures are the calculated alpha values.

Table 15: Correlation coefficients between summative status scores and component mastery test scores for all teachers trained under massed and distributed format.

SUMMATIVE STATUS REPORT

COMPONENT MASTERY TEST	Assessing	Prescribing	Teaching	Evaluating	Planning	Total
Assessing	.7257* .001					
Prescribing		.6056* .004				
Teaching			-.0504 .421			
Evaluating				.6843* .001		
Planning					.3288 .091	
Total						.6543* .002

* Significant, $\alpha \leq .05$.

The results of the correlation analysis for both groups of teachers (N = 18) shows a significant positive correlation for assessing, prescribing, evaluating and total score.

Discussion

The results of the correlation analysis indicate that in general, a relationship exists between a teacher's knowledge and implementation scores for both types of inservice training. In most cases, there appeared to be a stronger correlation between knowledge and implementation scores for the teachers trained within the distributed format.

The correlation coefficients for teaching were similar for each group, in that the coefficients were non-significant. The consistently low relationship between the teachers' knowledge and implementation scores for this subtest may be attributed to the need to expand the number of items on the summative status report to more closely match what was measured on the component mastery test. The teaching component is the only element of the I CAN instructional system to produce a low correlation across both training groups. Other aspects of teaching were covered in assessment, prescription, and evaluation. (See Appendix I for a summative status report.)

The correlations for the evaluation component were positive for both groups of teachers, with a significant coefficient for the distributed group and for teachers across both groups. Therefore, the data suggest a consistent positive relationship between a teacher's knowledge level and their ability to implement the basics of student evaluation.

The major difference in correlations between massed and distributed trained teachers occurred for the planning component. While the massed trained group had a significant positive correlation, the distributed group attained a non-significant relationship. The massed group produced a stronger relationship.

Although the correlation coefficient for the massed group of teachers was non-significant for total score, the distributed group produced a significant relationship. When

teachers were combined across training groups, the result was a positive, significant correlation between knowledge scores and teacher implementation scores. The significant correlation appears to be the result of combining the training groups, thereby increasing the number of subjects.

Post-Training Survey Results

Upon completion of the sixteen week training program, all participants completed a post-training questionnaire administered to determine subject attitude toward three major areas:

a. The need for training;

b. The use of a demonstration center for training;

c. The need for follow-up support in the classroom for implementation of the system.

The following is a brief summary of the results of the questionnaire administration (see Appendix J for a more detailed report of the results).

a. All participants expressed a need for formal training versus being given the material without training. Participants also felt the twelve hour training portion of the total program was the minimum time required, with 46 percent opting for fourteen hours or more of instruction. All thirty-one participants felt that given the circumstances, the FSU staff should conduct the formal training sessions.

b. All participants, N = 31, expressed the need to be trained at a field based demonstration/training site versus

a university setting. A majority of participants, 67 percent, felt that training visits should be completed during the early stages of the total training/implementation program.

c. A large majority, 86 percent, felt that follow-up reports should be given to teachers in their teaching situation. The participants were in favor of the teacher consultant (TC) providing the follow-up service rather than the FSU staff (52 percent to 32 percent). In addition, 66 percent of the respondents expressed the feeling that the teacher should receive at least three site visits, with another 26 percent preferring four site visits during the implementation phase of the sixteen week program.

Summary Discussion

The results of this study indicate that, in general, both types of training are effective for use with a field-based inservice training program used to implement an objective-based instructional system in physical education for TMI students. A significant relationship is suggested between a teacher's knowledge and implementation skills. Any significant differences between training groups were in favor of the distributed trained participants.

The results of this investigation offer support and contradiction to the research cited during the formative phase of the study. The results reported herein are in partial agreement with several other studies in which no

significant difference was found between massed or distributed training formats (Tsas, 1948; Ash, 1959; Weaver, 1976; Braffet, 1976). However, numerous other studies had conflicting results in favor of the distributed approach (Reynolds and Glaser, 1964; Miller, 1967; Hilgard, et al., 1971; Butcher, 1975). At least one author reported results in favor of the massed approach (Underwood, 1961).

The results of the comparison of teacher implementation (with the assistance of a teacher consultant) during the sixteen week training/implementation period was measured by the summative status report. This evaluation revealed no significant difference between the massed and distributed trained teachers. No similar research was reported using teacher implementation as a means for judging the success of an inservice program. However, two authors have stated the need for using teacher implementation as a measurement of inservice success (Brimm and Tollet, 1974). Another author demonstrated the success of teacher observation as a criterion for determining the value of inservice education (Overline, 1972).

The relatively strong correlation between the teachers' knowledge test scores and their implementation scores may reflect the need for either a sufficiently high level of knowledge and/or sufficient time to properly implement an objective based instructional system such as I CAN, regardless of training format. The low correlation coefficient found between teachers' knowledge scores and their implementation scores

for the teaching component is constant across both training formats. This result may be due to an insufficient number of items for the teaching component on the summative status report. Elements of teaching were included in other components of the instructional system, namely assessing, prescribing and evaluating.

The information found in Tables 16, 17, and 18 provides a summary of data for the three hypotheses tested in this study.

Table 16: Summary of two way ANOVA's for component mastery test scores for teachers and consultants.

		Teachers		Consultants		Total	
		Sig.	Direct.	Sig.	Direct.	Sig.	Direct.
Component Mastery Test	Assess	No		No		No	
	Prescribe	No		No		No	
	Teach	No		Yes	Dist.	No	
	Evaluate	No		No		No	
	Plan	Yes	Dist.	No		Yes	Dist.
	Total	No		No		No	
		N = 18		N = 13		N = 31	

Table 17: Summary of one way ANOVA's for summative status report scores for teachers only.

		Significance	Direction
Summative Status Report	Assess	No	
	Prescribe	No	
	Teach	No	
	Evaluate	No	
	Plan	No	
	Total	No	

N = 18

Table 18: Summary of correlations between teachers' component mastery test and summative status report scores.

	Massed Significant	Distributed Significant	Total Significant
Assess	No	Yes	Yes
Prescribe	Yes	Yes	Yes
Teach	No	No	No
Evaluate	No	Yes	Yes
Plan	Yes	No	No
Total	No	Yes	Yes

N = 18

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary

The purpose of this investigation was to determine the effects of massed and distributed, field-based, inservice training programs on teachers and teacher consultants who were being trained to use an objective-based physical education system (I CAN). The study was conducted over a sixteen week training period. The participants trained under the massed approach were given two consecutive days of instruction, while the participants trained under the distributed schedule received their instruction via a one day training session with two one-half day sessions spaced at the second and fourth weeks of the sixteen week training/implementation program. Each group of participants was given identical instruction and training content by the FSU staff who used the same materials and agendas for their respective training and follow-up sessions. Teachers and consultants were issued implementation schedules with specific tasks to guide their respective activities during the follow-up component of the sixteen-week training schedule. Each teacher implemented the same physical education program objectives selected from the I CAN resource materials for equivalent

time periods and received a visit from their teacher consultant every three weeks.

This study was designed to measure the effects of two field-based inservice training approaches upon the knowledge acquisition and implementation skills of teachers and teacher consultants using the I CAN objective-based physical education instructional system.

All participants completed the component mastery knowledge test during the sixteenth week of their training schedule. In addition, a summative status report was used by a FSU staff member to evaluate the implementation skills of those participants with direct teaching responsibilities in physical education while they conducted a physical education lesson using the I CAN system. A correlation coefficient was calculated between teachers' component mastery test (knowledge) score and their summative status report (implementation) score when teaching with I CAN. The reliability of the component mastery knowledge test was high, (R = .82).

A post-training questionnaire was administered via telephone within two weeks of the completion of the sixteen week training/implementation program. The questionnaire was designed to measure participant reaction to the overall training/implementation program. The twelve item questionnaire was divided into three areas:

a. The need for training;

b. The use of a demonstration center for training;

c. The need for follow-up support in the classroom for implementation of the system.

Three hypotheses were investigated which dealt with the effect of the training program upon knowledge, implementation skills and the relationship between each of the aforementioned variables.

The results of the study are reported in summary form by hypothesis.

Hypothesis One. There are no significant differences between the knowledge levels of participants (teachers and teacher consultants) trained under a massed field-based training schedule (two consecutive one-day sessions within a total sixteen-week training program), compared to those participants trained under a distributed field-based schedule (one day followed by two, one-half day sessions offered the second and fourth weeks of a sixteen week field-based training schedule).

For hypothesis one, the data analysis suggests that:

1.1 When comparing all participants by massed or distributed training groups, there was no significant difference between knowledge levels as measured by the component mastery test total score. The mean total score for the distributed group was 85 percent while the massed trained group average was 79 percent. Both group scores exceed the competency criteria of 75 percent established by the Field Service Unit staff as the minimum knowledge level required for implementation.

1.2 The following results are suggested when comparing training groups on the five components (assess, prescribe, teach, evaluate, plan) of the I CAN system:

1.2.1 When comparing only teachers by training group there was no significant difference on test scores for assessing, prescribing, teaching and evaluating. There was a significant difference on one component, planning, in favor of the distributed group of teachers.

1.2.2 When comparing only teacher consultants' subtest scores, there was a significant difference in favor of the distributed group for only the teaching component test score. There was no significant difference between teacher consultants for any other subtest of the component mastery test.

1.2.3 When considering all participants' subtest scores by training group there was a significant difference in favor of the distributed group for the planning subtest only.

Hypothesis Two. There are no significant differences in the level of teacher implementation when trained under a massed or distributed format within a sixteen week field-based training schedule including follow-up service by their teacher consultant.

For hypothesis two, the data analysis suggest that:

2.1 For the summative status report, which is a measure of teacher implementation skills, there was no

significant difference on total score for teachers trained under the massed or distributed formats. Teachers trained under the massed format implemented at the 78 percent level of efficiency and those within the distributed approach averaged 81 percent efficiency. Both groups of teachers exceeded the minimum implementation criteria of 75 percent established by the Field Service Unit staff as indicative of acceptable implementation of the I CAN system.

2.2 There were no significant differences between the massed and distributed trained groups (teachers only) when comparing subtest scores.

Hypothesis Three. There are no significant correlations between a teacher's knowledge of an objective-based instructional system (I CAN), and their ability to implement a system as intended.

For hypothesis three, the data analysis suggest that:

3.1 When calculating the correlation between a teacher's component mastery test score and summative status report score, there was a significant relationship for the assessing, prescribing, and evaluating components of the I CAN system for teachers trained under the distributed format. Those teachers trained under the massed approach had significant correlations for the prescribing and planning components of the I CAN system.

3.2 When considering all teachers across both training programs, a significant correlation was produced when considering each teacher's summative status report and component

mastery test scores for the subtests of assessing, prescribing, evaluating and total scores.

The administration of the post-training questionnaire to the thirty-one participants resulted in several findings of interest. All subjects expressed a need for the twelve hour training segment with a sizeable minority opting for several more hours of instruction. The concept of being trained at a field-based demonstration center drew a positive response as did the use of teacher consultants as follow-up personnel.

Conclusions

Within the limitations of these data, the following conclusions were formulated:

Knowledge Acquisition as Measured by the Component Mastery Test

Although participants score at a high level of proficiency for total test score under both types of training when testing for knowledge acquisition and retention of the I CAN system, several differences were found for subscores in favor of the distributed trained teachers or teacher consultants.

Implementation Skills as Measured by Summative Status Score

Teacher implementation of the I CAN system during the total training period was not significantly different for teachers trained under the two training programs. Both training formats were equally effective when teacher

implementation skills were measured. Teachers can be trained to implement an objective-based instructional system on specified physical education objectives.

Relationship Between Knowledge Acquisition and Implementation Skills

There appears to be a moderate to high relationship between teachers' knowledge skills attained during training and their ability to implement these skills in their own teaching assignment when using an objective based instructional system (I CAN). The distributed trained teachers had more significant correlations and generally higher relationships between knowledge and implementation than did the massed trained teachers. The correlations may reflect the need for either a high level of knowledge and/or sufficient time to properly implement an objective based instructional system regardless of training format.

Implications

1. Field-based inservice training involving an objective-based physical education instructional system (I CAN) can be conducted effectively using either a massed or distributed training program for teachers and teacher consultants of TMI.

2. The decision to implement either a massed or distributed inservice training model could be made based on whichever approach is the most cost-effective and preferred by participants for a given situation.

3. Evaluation of a field-based inservice-training program, using both knowledge acquisition and implementation skills, may be an effective methodology for determining the success of inservice training for teachers and teacher consultants who deliver physical education services to TMI students.

4. Teachers are able to acquire and retain significant amounts of knowledge when given the opportunity to internalize and immediately apply this information to their teaching situation and when given regular follow-up support by a teacher consultant.

Recommendations

The following recommendations are offered as a result of this study:

1. Implement a follow-up study to determine the impact of the long-term use of an objective-based instructional system (I CAN) in the selected school sites and demonstration centers. Determine if teachers are implementing the system as intended, and if teacher consultants are providing staff development, causing a ripple effect to other teachers and teacher consultants in local situations.

2. Refine the instruments used for data gathering through an item analysis procedure to analyze the essential component items for both knowledge and implementation skills of the I CAN objective-based system.

3. Use the self-monitor forms for the total evaluation

process for teachers and teacher consultants.

4. Investigate the effectiveness of the field-based training program in terms of student learning behavior gains.

5. Develop training manuals that are self-instructional for use by both teachers and teacher consultants incorporating self-monitor forms which focus on identifiable competencies required to implement an objective-based instructional system.

6. Analyze cost benefit results in terms of teacher consultant and student gains to include knowledge and implementation skills and long-term program modification.

7. Teacher consultants who offer continuing or follow-up service during a similar training program should be trained prior to, rather than concurrently with, their teachers.

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APPENDICES

APPENDIX A

I CAN OVERVIEW

I CAN OVERVIEW

I CAN is an objective-based instructional system designed to improve the delivery of physical education services to handicapped populations. It can be used by physical education specialists, classroom teachers or a combination of both. Design specifications resulted in a program which: 1) provides for diagnostic-prescriptive teaching of students who range in ability from near zero competence to functional competence on a wide variety of physical performance skills and knowledges; 2) is responsive to the needs of local educational agencies to either build a rational program or select materials to supplement an already existing program; 3) is not dependent on elaborate equipment and/or facilities; and 4) provides for user compliance with PL 94-142 and other accountability laws when implemented as intended.

The system consists of two major components. A teacher's implementation guide provides the information necessary to appropriately use the instructional materials, and secondly, the instructional resource materials guide the systematic teaching of a large variety of independent physical education content (termed performance objectives in the program). Inservice procedures and materials have also been developed to guide the education of teacher and teacher

consultants in the use of the system.

The implementation guide provides the information necessary to conduct 1) program planning, 2) long-term planning, 3) assessment of student status, 4) prescription of instruction based upon assessed needs, 5) implementation of teaching-learning activities associated with prescriptions, and 6) student and program evaluation of the results of instruction. Program planning and long-term planning are concerned with the derivation and appropriate placement of relevant program goals and objectives. Assessment, prescription and teaching chapters describe the mechanics of systematic teaching. The evaluation section describes the procedures necessary for reassessing and reporting student achievements and deciding on instructional and program plan modifications.

The instructional resource materials are divided into primary and secondary skills. Primary content includes 71 performance objectives (POs) for ages 5 through 14 and 79 secondary level POs for ages 15 through 25. The primary skills are divided into: Fundamental Motor Skills (12 locomotor and 11 object control POs); Body Management (7 body awareness and 11 object control POs); Health Fitness (6 fitness and growth and 9 postural control POs); and Aquatics (7 basic skill and 8 swimming and water entry skills POs). The secondary skills are divided into: Backyard/Neighborhood Activities (7 badminton, 2 croquet, 2 horseshoes, 4 roller-skating and 2 tetherball POs); Team Sports (8 basketball, 3

kickball, 4 softball, and 6 volleyball POs); Outdoor Activities (2 backpacking, 4 camping, 2 hiking and 6 cross country skiing POs), and Dance and Individual Sports (3 bowling, 7 folk dance, 11 gymnastics and 6 track and field POs).

Performance objectives are included for both psychomotor (skill) and cognitive activities. Each skill objective is divided into sequential instructional levels which range in performance competence from assisted performance, 2) rudimentary (modeled) performance, 3) qualitative pattern (biomechnically efficient), 4) qualitative pattern plus a distance and/or control criterion, and 5) functional performance (a qualitative pattern plus distance and/or control and accuracy at a criterion level enabling participation in sports of the culture). The cognitive objectives are also divided into instructional levels represented as: 1) physical performance, 2) modeled performance, and 3) functional performance (criterion performance is initiated with a verbal or equivalent cue). The instructional levels of all POs are stated in behavioral terms and have both qualitative and quantitative standards. The standards are operationally defined by focal points (discrete, measurable elements of skill) within each instructional level. Focal points are the units upon which assessment, teaching and performance improvements are based.

APPENDIX B

LOCATION OF TRAINING CENTERS

Components of Demonstration Sites:

1. Training site for interested persons who wish to gain skills in planning and implementing a diagnostic-prescriptive instructional system.
2. Replicable model for implementation of an accountability system for the delivery of physical education services.
3. Resource center to aid trained teachers with specific problems in the implementation and management of a diagnostic-prescriptive instructional system.

APPENDIX C

TEACHER CONSULTANT ASSIGNMENTS

Teacher Consultant Assignments

General: For the duration of the training program we are requesting that the teachers operate within the following constraints: (1) Select one class of trainable mentally retarded students, ages 5-14; (2) Teach the assigned objectives for approximately two 35-minute classes per week; (3) Follow the assignments as closely as possible.

Week Two
Contact teachers and confirm visitation.
Visit demonstration center.*

Week Three
1. Visit teacher.
2. Arrive approximately 20-30 minutes prior to the scheduled class observation. Discuss procedures for monitoring with teacher. Request teacher to demonstrate, during the class, any problems being encountered.
3. Work with teacher in the implemention of the lesson. Complete consultant monitoring form.
4. Using teacher self-monitoring forms and consultant monitor forms, discuss with teacher problems of concern. Attempt to identify alternative solutions.
5. Record problems and alternative solutions suggested.
6. Review the Run objective. Assign the Run as next objective to be implemented.

Week Four
1. Visit demonstration center.*
2. Bring consultant monitoring forms, identified problems and suggested alternatives.
3. Bring Performance Objectives and Implementation Guide.

Week Five
1. Confirm week six visitation with teacher.

Week Six
1. Visit teacher.
2. Arrive approximately 20-30 minutes prior to the scheduled class observation. Discuss procedures for monitoring with teacher. Request teacher to demonstrate, during the class, any problems being encountered.

* Only participants trained under distributed format.

3. Work with teacher in the implementation of the lesson. Complete consultant monitoring form.
4. Using teacher self-monitoring forms and consultant monitoring forms, discuss with teacher problems of concern. Attempt to identify alternative solutions.
5. Record problems and alternative solutions suggested.
6. Review and assign Stamina and Body Parts objectives.
7. With teacher, design a program plan for the balance of year. Weeks seven-sixteen plan for objectives as assigned. Total time needed - approximately three hours for planning.

Week Eight

Confirm week nine visitation with teacher.

Week Nine

1. Visit teacher.
2. Review yearly program plan for completeness and accuracy.

Week Twelve

1. Visit teacher.
2. Arrive approximately 20-30 minutes prior to the scheduled class observation. Discuss procedures for monitoring with teacher. Request teacher to demonstrate, during the class, any problems being encountered.
3. Work with teacher in the implementation of the lesson. Complete consultant monitoring form.
4. Using teacher self-monitoring forms and consultant monitoring forms, discuss with teacher problems of concern. Attempt to identify alternative solutions.
5. Record problems and alternative solutions suggested.

Week Fifteen

1. Confirm final visitation with teacher.

Week Sixteen

1. Complete evaluation of training program.
2. Complete consultant evaluation--posttest.
3. Visit teacher with project representative.
4. Arrive approximately 20-30 minutes prior to the scheduled class observation. Discuss procedures for monitoring with teacher. Request teacher to demonstrate, during the class, any problems being encountered.

5. Work with teacher in the implementation of the lesson. Complete consultant monitoring form.
6. Using teacher self-monitoring forms and consultant monitor forms, discuss with teacher problems of concern. Attempt to identify alternative solutions.

APPENDIX D

TEACHER ASSIGNMENTS

TRAINING PROGRAM AND
TEACHER'S ASSIGNMENTS

GENERAL: For the duration of the training program please operate within the following constraints: (1) select one class of trainable mentally retarded students, ages 5-14, (2) teach each assigned objective for approximately ten minutes, two days per week, (3) follow the assignments as closely as possible.

Week One

Day One

1. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing the Overhand Throw.
2. Implement the assessing activity. Conduct assessment activity until all the students have been assessed.
3. Assess and record student performance on the Class Performance Score Sheet.
4. Record any problems encountered.

Day Two

1. Select and plan an assessment activity using an I CAN Game (or design your own game) for assessing the Overhand Throw.
2. Implement the assessing activity. Conduct the assessment activity until all the students have been assessed.
3. Assess and record student performance on the Class Performance Score Sheet.
4. Record any problems encountered.
5. Complete self-monitoring form for assessment.

Week Two

Day One

1. Review Class Performance Score Sheet and identify focal points for instruction for each student.

2. Select instructional activities for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess; record changes.

5. Record any problems encountered.

Day Two 1. Review Class Performance Score Sheet and identify focal points for instruction for each student.

2. Select instructional activities for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess, record changes.

5. Record any problems encountered.

6. Complete self-monitoring form for prescription.

Day Three 1. Receive training at demonstration center with consultant.*

Week Three
Day One 1. Review Class Performance Score Sheet and identify focal points for instruction for each student.

2. Select a Game activity for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess; record changes.

5. Record any problems encountered.

* Distributed trained groups only.

Day Two

1. Complete instruction on the Overhand Throw.
2. Reassess and record student progress on the Class Performance Score Sheet. Identify student change and record on the student progress sheet.
3. With teacher consultant, review self-monitoring forms, consultant monitoring forms and implementation procedures.
4. Receive new assignment - Run.

Week Four

Day One

1. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing the Run.
2. Implement the assessing activity. Conduct assessment activity until all the students have been assessed.
3. Assess and record student performance on the Class Performance Score Sheet.
4. Record any problems encountered.

Day Two

1. Select and plan an assessment activity using an I CAN Game (or design your own game) for assessing the Run.
2. Implement the assessing activity. Conduct the assessment activity until all the students have been assessed.
3. Assess and record student performance on the Class Performance Score Sheet.
4. Record any problems encountered.
5. Complete self-monitoring form for assessment.

Day Three

1. Receive training at demonstration center with consultant.*

* Distributed training groups only.

Week Five

Day One

1. Review Class Performance Score Sheet and identify focal points for instruction for each student.
2. Select instructional activities for teaching identified focal points.
3. Complete daily lesson plan.
4. Teach and reassess; record changes.
5. Record any problems encountered.

Day Two

1. Review Class Performance Score Sheet and identify focal points for instruction for each student.
2. Select instructional activities for teaching identified focal points.
3. Complete daily lesson plan.
4. Teach and reassess, record changes.
5. Record any problems encountered.

Week Six

Day One

1. Review Class Performance Score Sheet and identify focal points for instruction for each student.
2. Select a Game activity for teaching identified focal points.
3. Complete daily lesson plan.
4. Teach and reassess; record changes.
5. Record any problems encountered.

Day Two

1. Complete instruction on the Run.

2. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing the Run.

3. Implement the assessing activity.

4. Reassess and record student progress on the Class Performance Score Sheet. Identify student change and record on the student progress report.

5. With teacher consultant, review self-monitoring forms, consultant monitoring forms and implementation procedures.

6. Receive new assignment - Body Parts and Stamina.

7. Design a ten week plan using four performance objectives.

8. Develop a yearly program plan with teacher consultant.

Week Seven

Day One

1. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing the Body Parts.

2. Implement the assessing activity. Conduct assessment activity until all the students have been assessed.

3. Assess and record student performance on the Class Performance Score Sheet.

4. Record any problems encountered.

Day Two

1. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing Stamina.

2. Implement the assessing activity. Conduct assessment activity until all the students have been assessed.

3. Assess and record student performance on the Class Performance Score Sheet.

4. Record any problems encountered.

Week Eight

Day One
1. Review Class Performance Score Sheet for Body Parts, Run, Stamina, and Overhand Throw and identify focal points for instruction.
2. Select instructional activities and/or games for teaching identified focal points.
3. Complete daily lesson plan.
4. Teach and reassess; record changes.
5. Record any problems encountered.

Day Two
1. Review Class Performance Score Sheet for Body Parts, Run, Stamina and Overhand Throw and identify focal points for instruction.
2. Select instructional activities and/or games for teaching identified focal points.
3. Complete daily lesson plan.
4. Teach and reassess; record changes.
5. Record any problems encountered.
6. Complete self-monitoring form for prescription.

Week Nine

Day One
1. Review Class Performance Score Sheet for Body Parts, Run, Stamina, and Overhand Throw and identify focal points for instruction.
2. Select instructional activities and/or games for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess, record changes.

5. Record any problems encountered.

6. With teacher consultant, review self-monitoring forms, consultant monitoring forms and implementation procedures. Finalize program plan for balance of year.

Week Ten
Day One

1. Review Class Performance Score Sheet for Body Parts, Run, Stamina, and Overhand Throw and identify focal points for instruction.

2. Select instructional activities and/or games for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess; record changes.

5. Record any problems encountered.

Week Ten
Day Two

1. Review Class Performance Score Sheet for Body Parts, Run, Stamina, and Overhand Throw and identify focal points for instruction.

2. Select instructional activities and/or games for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess; record changes.

5. Record any problems encountered.

6. Complete self-monitoring form for prescription.

Week Eleven

Day One
1. Complete instruction on Body Parts.
2. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing Body Parts.
3. Implement the assessing activity.
4. Reassess and record student progress on the Class Performance Score Sheet. Identify student change and record on the student progress report.

Day Two
1. Select and plan an assessment activity from the I CAN materials (or design your own) for assessing Directions.
2. Implement the assessing activity. Conduct assessment activity until all the students have been assessed.
3. Assess and record student performance on the Class Performance Sheet.
4. Record any problems encountered.

Weeks Twelve-Fifteen

Day One
1. Review Class Performance Score Sheet for Body Parts, Run, Stamina, and Overhand Throw and identify focal points for instruction.
2. Select instructional activities and/or games for teaching identified focal points.
3. Complete daily lesson plan.
4. Teach and reassess; record changes.
5. Record any problems encountered.

Day Two
1. Review Class Performance Score Sheet for Body Parts, Run, Stamina, and

Overhand Throw and identify focal points for instruction.

2. Select instructional activities and/or games for teaching identified focal points.

3. Complete daily lesson plan.

4. Teach and reassess; record changes.

5. Record any problems encountered.

Week Sixteen

Day One 1. Complete Component Mastery Test. Complete instruction in the Stamina and Run.

2. Reassess and record student progress on the Class Performance Score Sheet. Identify student change and record on the student progress report.

Day Two 1. Complete instruction on the Directions and Overhand Throw.

2. Reassess and record student progress on the Class Performance Score Sheet. Identify student change and record on the student progress report.

Evaluation of total training program by teacher. Teacher evaluation of implementation by teacher consultant and Field Service Unit.

APPENDIX E

THE ROLE OF DEMONSTRATION CENTERS

The Role of Demonstration Centers

The I CAN demonstration centers were established in geographically strategic locations throughout Michigan. The centers were designed to serve as training sites for professional educators who volunteered for training in implementing a diagnostic-prescriptive physical education program. Each center was staffed by at least one teacher who demonstrated the ability to conduct a replicable physical education program using the I CAN system. Each demonstration site also served as a resource center to assist participants with specific concerns in the implementation and management of a diagnostic-prescriptive instructional system. The fact that centers were decentralized also served to promote the utilization of an instructional system implemented on a local level to meet the mandates for equal physical education for all handicapped students.

APPENDIX F

COMPONENT MASTERY TEST DIRECTIONS

Component Mastery Test Directions

The following is an excerpt from a memorandum sent to all participants instructing them to complete the component mastery test.

> All teachers and consultants should complete the enclosed Component Mastery Test (closed book -- without referring to teacher's guide, notes, etc.), prior to the scheduled visitation. (The purpose of this test is to help us assess the effectiveness of our training program -- no one will be "graded" on this.) The test can then be reviewed and any questions answered during the discussion session at the time of the visitation.

APPENDIX G

COMPONENT MASTERY TEST

COMPONENT MASTERY TEST

ASSESSMENT

Teacher's Name_____

Date_____

1. There are five sequential steps that should be taken to properly implement the assessment process of I CAN. It is your task to match the sequential steps with their process statement. To do this place the letter of the correct assessment process statement in the blank space next to the appropriate step in the process.

Steps in Assessment	Assessment Process Statement
____First step in Assessment Process.	a. Review the assessing activity provided for each objective.
____Second step in Assessment Process.	b. Identify the focal point in each objective to which you will instruct each student.
____Third step in Assessment Process.	c. Review objectives from your Program Plan for this week.
____Fourth step in Assessment Process.	d. Study the Class Performance Score Sheets (CPSS) and learn the recording process.
____Fifth step in Assessment Process.	e. Be prepared to implement teaching strategies.
	f. Set up and begin the assessing activity.
	g. Study the focal points at the skill levels for objectives you plan to teach and assess.

2. Below you will find 6 concepts which are integral to the process of assessment. It is your task to match every term with its correct definition. To do this, place the letter of the correct definition in the blank space next to the appropriate term.

Terms	Definitions
____Assessment	a. A technique for determining students status.
____Performance Objective	b. Provided so that the teacher may keep a record of student status.
____Focal Point	c. Contains suggested procedures for determining performance on a selected objective.
____Class Performance Score Sheet	d. A behavioral statement related to a specific motor skill.
____Assessment Activity	e. A component of skilled performance at a specified skill level.
____Skill Level	f. A sequential learning task.

3. Your monthly program plan consists of a number of objectives. Circle the letter below that represents how many performance objectives you should initially assess during that month.

   a. Only the skill you will spend the most instructional time with.
   b. Assess only those skills which you plan to devote at least 3 instructional class periods to.
   c. All skills that are listed in the monthly plan need to have an initial assessment,
   d. There is no absolute rule as to the specific number of objectives that should be assessed, and the actual number depends upon a combination of factors.

For Items 4 and 5 put a check in the appropriate box to indicate if the statement is True or False.

4. To make effective use of your assessing period, at least 50% of the students who are being assessed should be visible to the teacher.

   True ☐ False ☐

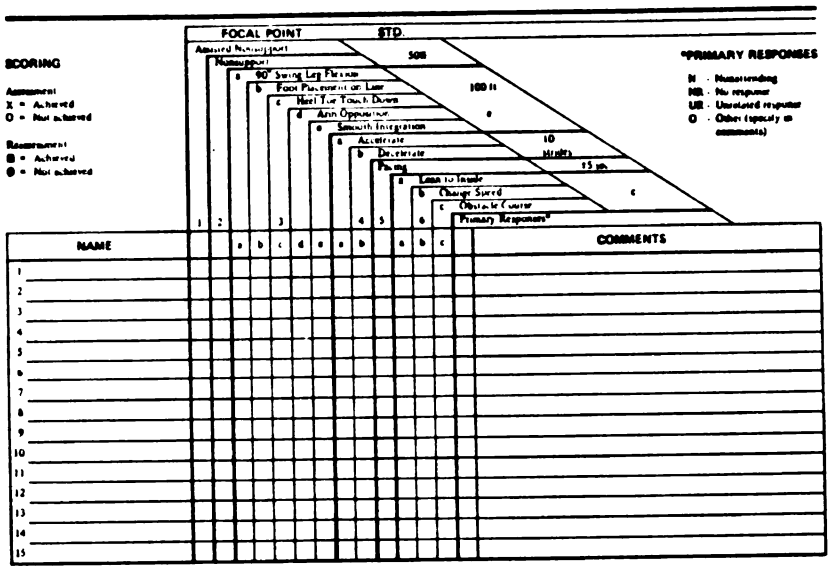
5. Assessment activities are preceded by an accurate demonstration of the performance objective.

   True ☐ False ☐

6. _____

I CAN

PERFORMANCE OBJECTIVE: Run



7. _____

I CAN

PERFORMANCE OBJECTIVE: To Demonstrate A Functional Run

1. Engage students in running activity.
2. While you teach, assess each student's entry level status.
3. After sufficient observation, record their status, using the Class Performance Score Sheet.
4. Note which skill level each student has mastered.
5. Observe each student's particular style to determine whether your teaching strategy should involve verbal or nonverbal techniques of communication.
6. Plan lessons according to students' needs and their statuses, based on your physical education goals.
7. Continue to teach and assess students using I CAN Instructional Activities.

DIRECTIONS	ORGANIZATION & MATERIALS
Organize the students into stations, with no more than about 4 to 6 per station. Each student should have individual attention from teacher or aide. Introduce the run. Model the mature run (action, distance, and speed) as defined in the Performance Objective description. Action - head here - place feet on or near line - run heel toe or toe-heel toe - swing arms in opposition - run smoothly Distance - moderate (50 to 100 feet) Speed - moderate to fast Tell students: DO THIS RUN FAST Have each student run the distance. Physically assist students who do not run. At each station the teacher or aide will teach and assess students' performance, recording progress on the Class Performance Score Sheet. Repeat the activity until all students have been assessed or until students become bored.	Organization XXXXX Station 1 50' 100' XXXXX Station 2 Materials 1 inch masking tape to mark start and finish lines

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COMPONENT MASTERY TEST

PRESCRIPTION

Teacher's Name_____

Date_____

1. There are four sequential steps that should be taken to properly implement the prescription process of I CAN. It is your task to match the sequential steps with their process statement. To do this place the letter of the correct prescription process statement in the blank space next to the appropriate step in the process.

Steps in Prescription	Prescription Process Statement
____First step in Prescription Process.	a. Identify the focal point in each objective to which you will instruct each student.
____Second step in Prescription Process.	b. Study the CPSS and learn the recording process.
____Third step in Prescription Process.	c. Review CPSS you have marked.
____Fourth step in Prescription Process.	d. Review the instructional activities, select methods you plan to use in your next teaching sessions.
	e. Review the teaching strategies and be prepared to implement them.
	f. Organize all these activities into a daily lesson.

2. _____

I CAN

PERFORMANCE OBJECTIVE: Run

1
BASE RUNNING

Materials:
5-10 car mats or rubber bases

Related Social Skills:
- Competes with another student
- Exhibits courtesy toward others

Play Groupings And Age
Individual or small group play - 5-14 years

Object:
To run around bases in a circle.

ORGANIZATION:
Circle

DIRECTIONS:
Form a circle with bases. Have each student stand on a base, there may be more bases than students

Say: WHEN I SAY GET READY, GET SET, GO, YOU RUN AROUND THE CIRCLE ON THE BASES. RUN AS FAST AS YOU CAN. KEEP RUNNING UNTIL I SAY STOP. LET'S TRY IT. GET READY, GET SET, GO! . . . STOP. WHEN I SAY STOP, FIND A BASE AND STAND ON IT. (demonstrate)

Have students practice. Stop and start several times to get used to the signals. If a student does not understand the game, run with him, holding his hand. Emphasize running AS FAST AS YOU CAN, and the stop and go signals.

When all students understand the game, instruct and assess as the game is played.

TEACHING ALTERNATIVES:
1. Signals for stop and go can be made to suit your style. You may wish to use a whistle or music for signals.
2. Use this game for other locomotor skills, jump, hop, skip, slide, etc.

3. _____

I CAN

PERFORMANCE OBJECTIVE: Run

1. Run With Assistance

TEACHING DIRECTIONS:

1. Model and practice the run.
2. Manipulate those students who do not run by grasping their arms and running or tying a rope around their waist and pulling. This may be accomplished by pairing a student who runs with one who does not.

FOCAL POINTS	WHAT TO DO	WHAT TO SAY	MATERIALS	ORGANIZATION
Consistent periods of non support	Grasp the student's hand. Make sure student's other hand is free to swing. Pull student by the hand	Run fast	None required	Scattered
	Tie a rope around child's waist. Pull from front. Have student run down an incline	Run fast	Rope 6 - 8 feet long	
	Model the correct running action of consistent periods of nonsupport	Do this. Watch me run. Run as fast as you can	None required	

GAMES
Base Running

ACTION WORDS
RUN WATCH
FAST DO THIS

4. Circle the letter next to the conditions you should consider in selecting focal point(s) for instruction:

   a. Possible instructional groupings

   b. Teacher's ability to demonstrate the focal point(s)

   c. Closeness of student performance to the focal point

   d. Size of the physical education facility

For Items 5 and 6 put a check in the appropriate box to indicate if the statement is True or False.

5. All games played during on task time must relate to objectives found in the program plan.

   True ☐ False ☐

6. Use the time definitions from your yearly plan to help generate daily lesson plans.

   True ☐ False ☐

For questions 7 through 10, write on the blank the term that is defined by the statement.

7. _____ organized play activities for practicing skills

8. _____ a process involving the selection of instructional activities based on assessed needs

9. _____ contains ways to organize students, model and give verbal cues related to specific skill levels and focal points

10. _____ key concepts judged as important for emphasis in helping the student translate instructions to appropriate actions.

I CAN Implementation

COMPONENT MASTERY TEST

TEACHING

Teacher's Name_____

Date_____

1. Below you will find 5 statements, 4 of which constitute the teaching Process of I CAN. Indicate if the statement belongs or does not belong in the teaching process by circling either the Yes or the No by each statement.

Yes	No	Motivate and reinforce
Yes	No	Determine the amount of change for each student
Yes	No	Assemble the teaching materials and equipment
Yes	No	Instruct
Yes	No	Review the teaching strategies and be prepared to implement them

2. Fill in the term which best describes the concept that is being defined.

   a. _____Interpersonal skills which may be taught during game play.

   b. _____The amount of time spent in instruction or practice of planned objective.

3. Place a check by the statement(s) which are reasons for using Action Words within the context of a lesson.

   ____a. To facilitate transfer of the learning to other subject matter.

   ____b. To teach the students to respond to short commands, in order to increase the on-task time.

   ____c. To stress the connection between the concrete action and the abstract word representing it.

For Item 4 put a check in the appropriate box to indicate if the statement is True or False

4. The best way to maximize on-task time is to group students according to their abilities, thus facilitating organization.

True ☐ False ☐

5. Read the lesson described below and answer the questions which follow.

It is well into the school year and the physical education specialist at Sunshine School, Ms. Klutz, is conducting a prescriptive lesson on the overhand throw to a class of 12 primary age TMR students. The classroom teacher, Mr. Teachless, deposits his students inside the gym door at 10:15 a.m. and rushes away to an important appointment with the coffee pot in the staff lounge. While Ms. Klutz and a student get the equipment for that day's lesson from the equipment closet, the full-time aide, Mrs. Helpful, carefully positions each student in a circle and keeps them sitting quietly. At 10:22 Ms. Klutz begins the lesson by standing in the middle of the circle and demonstrating a mature overhand throw, emphasizing the arm motion and weight transfer.

"OK, now I want Susie, Mike, John and Mary to go with Mrs. Helpful," Ms. Klutz directs. Mrs. Helpful leads the four students to one corner of the gym and places each student individually on small rubber mats. They remain there while Ms. Klutz and Mrs. Helpful locate the rest of the class in two other stations in a similar fashion, until by 10:30 all the students are in stations.

At one station, Ralph, who is the oldest student and highly skilled, demonstrates the overhand throw and gives simple directions to the students at that station. The students at Mrs. Helpful's station all need to work on the arm motion for throwing, so Mrs. Helpful works with one of them at a time while the others at that station stand on their mats watching. When a student makes a little improvement in performance, Mrs. Helpful gives them an M & M. Meanwhile Ms. Klutz has all the students at her station practicing weight transfer as she moves from one to another giving instruction.

After 10 minutes of throwing practice, Ms. Klutz realizes that the gym period is nearly over, so she shouts, "Time to stop! Everybody come to the circle." Some of the students don't hear her directions so they keep throwing, while others decide to play tag. Mrs. Helpful and Ms. Klutz round up the students by grasping hands or arms and physically moving students to the circle. One they are all sitting again, Ms. Klutz reviews the focal points as Ralph demonstrates the overhand throw to end the lesson at 10:45 a.m.

Circle the correct answers to the items below.

6. On-task time in this lesson is:

   a. High (71% or above)

   b. Moderate (50%-70%)

   c. Low (49% or below)

7. Ms. Klutz makes efficient use of assistants in this lesson.

   a. Yes

   b. No, but only because she doesn't have enough people to help her.

   c. No, but it would have been more efficient if Mrs. Helpful had worked with an entire group of students rather than one at a time.

8. There are two types of motivational methods evident in this lesson. They are:

   a. Reinforcement and self-direction

   b. Peer modeling and reinforcement

   c. Knowledge of results and repetition and practice

   d. None of the above

Check to indicate if statement is <u>True</u> or <u>False</u>

9. **This lesson demonstrates good organization and efficient movement of students from one formation to another.**

   True ☐ **False** ☐

I CAN Implementation 12/1[illegible]

COMPONENT MASTERY TEST

EVALUATION

Teacher's Name _____

Date _____

1. Below you will find 6 statements, 5 of which constitute the evaluation process of I CAN. Indicate if the statement belongs or does not belong in the process by circling either the Yes or No by each statement.

Yes	No	Select an appropriate action
Yes	No	Develop a list of Action Words
Yes	No	Determine the appropriate amount of positive change
Yes	No	Examine the class performance score sheet and determine the amount of change for each student
Yes	No	Determine the amount of change for the total group.
Yes	No	Reassess during class instructional activities.

2. Complete each sentence.

   a. The number of X marks over O's on reassessment is an indication of _____

   b. A permanent record of individual student's achievement is called _____

Circle the correct answers to the items below

3. The evaluation process in I CAN is based upon

   a. Pre-post testing

   b. Continual appraisal and reappraisal

   c. Neither pre-post testing nor continual appraisal and reappraisal

4. The determination of meaningful student gain in I CAN is determined

   a. by the amount of time it takes to teach one focal point

   b. by the amount of time it takes to teach one skill level

   c. through a statistical procedure

   d. by the teacher

For Items 5 and 6 put a check in the appropriate box to indicate if the statement is True or False.

5. The significance of any individual gain is determined relative to the students' abilities and the amount of time allotted to the performance objective.

   True ☐ False ☐

6. Whenever less than 50% of the students show a significant gain, it is obvious that there was less than 50% on-task time during instruction.

   True ☐ False ☐

I CAN Implementation

COMPONENT MASTERY TEST

PLANNING

Teacher's Name_____

Date_____

1. There are five sequential steps that constitute the planning process of I CAN. It is your task to match the sequential steps with their process statement. To do this place the letter of the correct planned process statement in the blank space next to the appropriate step in the process.

Steps in Planning	Planning Process Statement
____First step in Planning Process	a. Select performance objectives.
____Second step in Planning Process	b. Identify the skill levels for each performance objective.
____Third step in Planning Process	c. Adapt the sample plan to your class needs.
____Fourth step in Planning Process	d. Schedule time.
____Fifth step in Planning Process	e. Develop monthly plan.
	f. Establish physical education program goals.

2. For each one of the terms listed below, indicate, by circling, if it refers to a program goal, or to a performance objective.

a. Abdominal strength	goal	performance objective
b. Underhand roll	goal	performance objective
c. Competence in fundamental motor skills	goal	performance objective
d. Ascending and descending stairs	goal	performance objective
e. Develop and maintain function level of physical fitness	goal	performance objective
f. Knowledge of cognitive concepts	goal	performance objective

3. During your first year with I CAN your plan for each month should be based upon:

   a. What you were teaching last year during the same month.

   b. The time allotments for each performance objective on your yearly program plan.

   c. The relative contribution of the objectives to your goal for the month.

For Items 4 and 5 put a check in the appropriate box to indicate if the statement is True or False.

4. In order to adapt the sample long-term plan provided in the Implementation Guide, you need to change the Physical Education Time Available Table.

   True ☐ False ☐

5. As a guideline for planning, 60 minutes should be allotted for body management objectives.

   True ☐ False ☐

APPENDIX H

TEST QUESTIONS MATCHED TO TRAINING OBJECTIVES

Test Questions Matched to Training Objectives

ASSESSMENT

OBJECTIVES:

1. Knowledge of the steps for assessing in I CAN.
2. Knowledge of terms related to assessment:
    a. Assessment
    b. Performance Objective
    c. Skill Level
    d. Focal Point
    e. Class Performance Score Sheet
    f. Assessing Activity
3. Identification of performance objectives which need to be assessed.
4. Identification of 2 methods for learning to recognize skill components.
5. Identification of the Class Performance Score Sheet and Assessing Activity for I CAN Performance Objectives.
6. Correct completion of a Class Performance Score Sheet.
7. Ability to design or select an appropriate assessing activity.

PRESCRIPTION

OBJECTIVES:

1. Knowledge of the steps in prescribing I CAN.
2. Knowledge of terms related to prescription:

a. Prescription
b. Instructional Activity
c. Action Words
d. Games

3. Identification of the Instructional Activities and Games for I CAN Performance Objectives.

4. Identification of two things to consider when selecting focal points for instruction.

5. Ability to select appropriate Instructional Activities.

TEACHING

OBJECTIVES:

1. Knowledge of the steps in teaching I CAN.

2. Understanding of the teaching strategies described in the Instructional Activities Sheet.

3. Knowledge of the purpose and use of action words.

4. Describes procedures for maximizing "on-task" time.

5. Understands the use of motivational strategies.

EVALUATING

OBJECTIVES:

1. Knowledge of the steps in evaluating, using I CAN.

2. Knowledge of terms related to evaluation in I CAN:

   a. Evaluation
   b. Individual Records of Progress
   c. "Change"

3. Knowledge of the rationale for continuous assessment.

4. Correct completion of a CPSS.

5. Knowledge of the basis for determining significant or satisfactory student gain.

6. Identify change for each student.

7. Identify change for an entire group of students.

PROGRAM PLANNING

OBJECTIVES:

1. Knowledge of the steps in the I CAN program planning process.

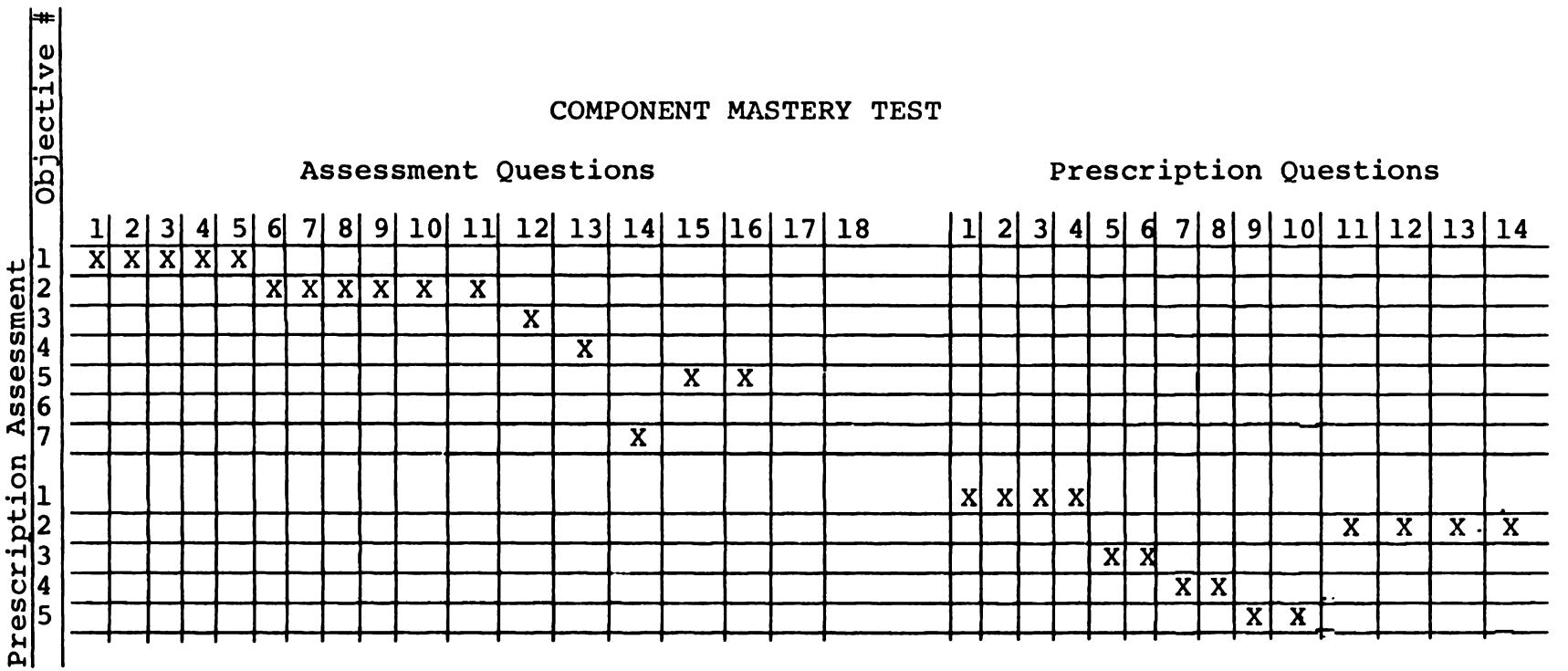
2. Identification of goal statements appropriate to a particular physical education program.

3. Identification of performance objectives which operationalize physical education goal statements.

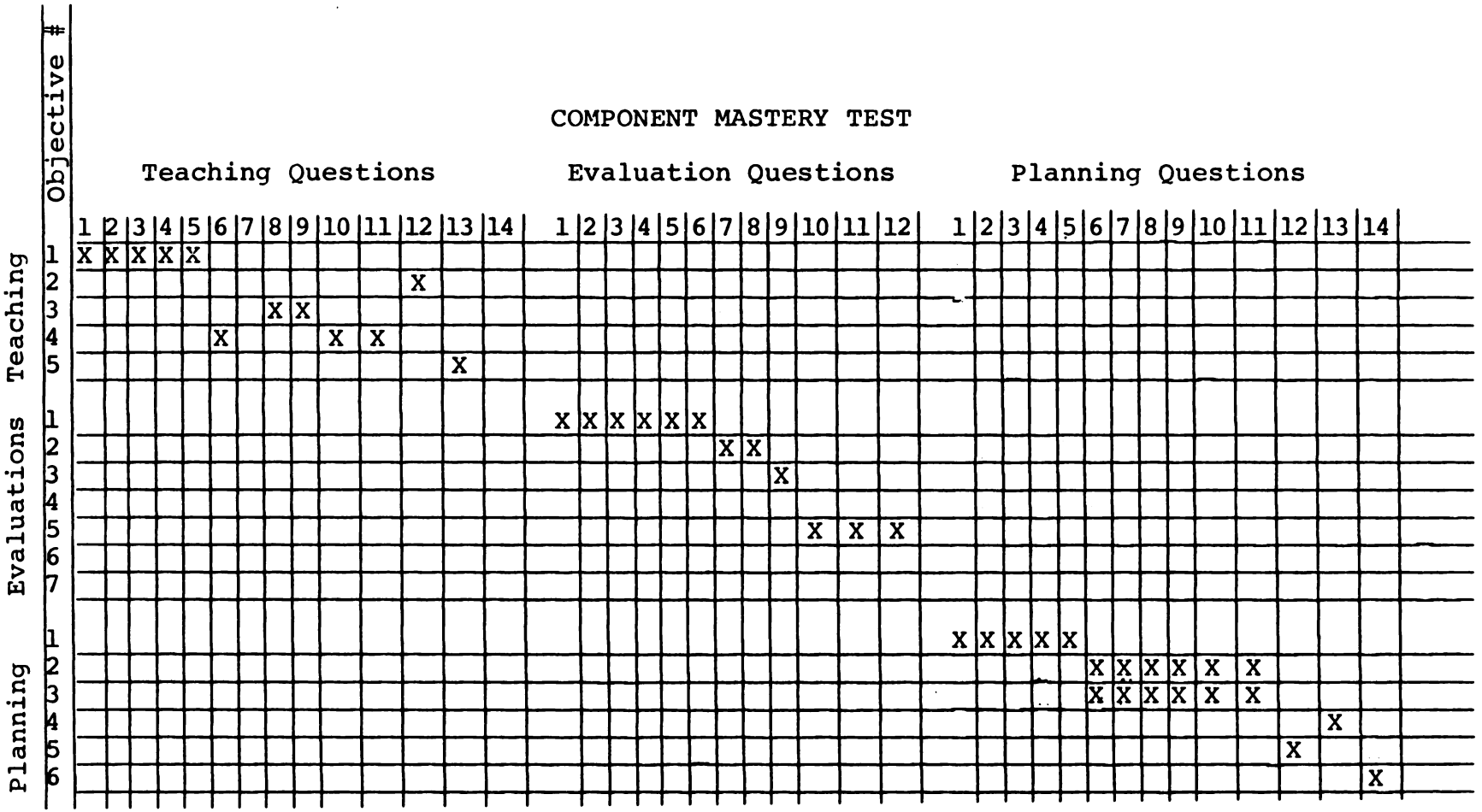
4. Classification of performance objectives by student developmental levels.

5. Completion of a time planning matrix for a one-year physical education program. Projects total amount of instruction time required by using the planning matrix.

6. Development of monthly program plans for one school year derived from the time matrix.



X = Test Question Matches Objective.



X = Test Question Matches Objective.

APPENDIX I

SUMMATIVE STATUS REPORT

SUMMATIVE STATUS REPORT

ASSESSMENT

Teacher's Name_____

Date_____

Interview

1. Is there a plan?	Yes	No	NA*
2. Is there a CPSS for each objective taught in the last 16 weeks?	Yes	No	NA
3. Does the CPSS include correct recording symbols and procedures?	Yes	No	NA
4. Looking at a Fundamental Skills, Aquatics or Health/Fitness CPSS, have skills been assessed without violation of Skills Level sequence?	Yes	No	NA

*Not applicable

I CAN Implementation 12/1/76

SUMMATIVE STATUS REPORT

PRESCRIPTION

Teacher's Name_____

Date_____

Interview

1. Ask the teacher to show you that day's lesson plan.

   Does one exist? Yes No NA*

   Does it contain an introduction, body and summary? Yes No NA

2. Is there a completed CPSS for each objective taught in that lesson? Yes No NA

3. a. Randomly select one performance objective.

   b. Randomly select 5 students in the class.

   c. Ask the teacher to indicate which Focal Point from the selected objective she will teach to each one of the 5 students.

   d. For each student selected, write down the CPSS mark for the Focal Point indicated by the teacher.

Student	Focal Point	CPSS Mark
1		
2		
3		
4		
5		

*Not applicable

4. What reason does the teacher give for selecting the Focal Points in item 3 (d)? Please use the following key.

   a. Closeness of performance to the Focal Point.

   b. Instructional grouping according to the Focal Point.

   c. The Focal Point selected meets the unique needs of the student.

   d. Other reason:

Student	Circle as many as apply
1	a b c d
2	a b c d
3	a b c d
4	a b c d
5	a b c d

5. Does the lesson plan include activities that allow for instruction on the Focal Points selected in question 3 (d)? Yes No NA

*Not applicable

I CAN Implementation 12/1/76

SUMMATIVE STATUS REPORT

TEACHING

Teacher's Name_____

Date_____

Observation:

Did this lesson allow for at least 50% on-task time? Yes No NA*

*Not applicable

I CAN Implementation 12/1/76

SUMMATIVE STATUS REPORT

EVALUATION

Teacher's Name_____

Date_____

1. Has reassessment been recorded for all students?	Yes	No	NA*
2. Is every skill level gain accompanied by a date inserted on the IRP for all students?	Yes	No	NA

*Not applicable

I CAN Implementation 12/1/76

SUMMATIVE STATUS REPORT

PLANNING

Teacher's Name_____

Date_____

1. Ask the teacher to show you a program plan with stated goals and performance objectives for the developmental level that is of concern, ~~to him.~~			
a. Does it exist?	Yes	No	NA*
b. Are there performance objectives for each goal?	Yes	No	NA
2. Ask the teacher to show you the yearly program time matrix?			
a. Does it exist?	Yes	No	NA
b. Are the performance objectives listed?	Yes	No	NA
c. Does it have the total physical education time for each month?	Yes	No	NA
d. Is the total projected time for each PO listed?	Yes	No	NA
3. Ask the teacher to show you all the monthly plans for the 16 weeks of instruction.			
a. Do they exist?	Yes	No	NA
b. Are PO and corresponding time allotments indicated for each instructional day?	Yes	No	NA

*Not applicable

APPENDIX J

POST-TRAINING TELEPHONE SURVEY RESULTS

Post-Training Telephone Survey Results

Within two weeks of the completion of the sixteen week training program, a telephone survey was conducted involving the thirty-one participants who took part in the study. Each subject was asked to respond to the following series of questions concerning the inservice program they had just finished:

1. Do you feel the inservice training was necessary for proper implementation of I CAN?

2. How many hours do you feel were necessary for training?

3. Who do you feel should have conducted the training?

4. How many physical education periods did you need or would you have needed before you would be comfortable using I CAN?

5. Do you feel the follow-up support was valuable?

6. Who do you feel should conduct the follow-up visits?

7. How many follow-up visits, if any, are needed?

8. At what point during the training should the visits take place?

9. How important was it to be trained at a demonstration center?

10. At what point, if any, during the training period should visits to the demonstration center be completed?

11. How many visits, if any, are needed to the demonstration center?

12. What is the optimal length in weeks of the training program?

The responses to each question have been tabulated and are formulated by both training and participant type. Answers are given by raw score and percent of total respondents.

MASSED MODEL

Partitipants Who Felt Need for Training	Hours Needed for Training	Participants Opinion as to Who Should Conduct Training	How Many Sessions Before Comfortable With Material
CRC 7 yes 23%	10 11-13 2 06% 2 06% 14 3 10%	FSU CRC Other 7 23% 0 0% 0 0%	1-4 5-9 2 06% 5 16% 10 1 03%
Teachers 10 yes 32%	10 11-13 0 0% 2 06% 14 8 26%	FSU CRC Other 10 32% 0 0% 0 0%	1-4 5-9 1 03% 7 23% 10 1 03%
DISTRIBUTED MODEL CRC 6 yes 19%	10 11-13 2 06% 3 10% 14 1 03%	FSU CRC Other 7 23% 0 0% 0 0%	1-4 5-9 1 03% 3 10% 10 2 06%
Teachers 8 yes 26%	10 11-13 1 03% 5 16% 14 2 06%	FSU CRC Other 6 19% 0 0% 0 0%	1-4 5-9 0 0% 8 26% 10 0 0%
NUMBER RESPONDING: 31	31	31	31

MASSED MODEL

Participants Who Felt It Is Important to Be Trained at Demonstration Center	The Time in Training Period When Participants Should Visit Demonstration Center	Number of Visits Needed to Demonstration Center According to Participants	Participant Opinion As Optimal Length of Entire Training Program (weeks)
CRC 7 yes 23%	5 early 17% 0 middle 0% 0 late 0% 2 throughout 6%	1-2 3-4 6 20% 1 03% 4 __ __%	10 11-13 1 03% 3 10% 14-16 16 3 10% 0 0%
Teachers 9 yes 29%	6 early 20% 0 middle 0% 0 late 0% 3 throughout 10% 1 no response	1-2 3-4 4 13% 4 13% 4 0 0%	10 11-13 1 03% 3 10% 14-16 16 6 __% 0 0%
DISTRIBUTED MODEL			
CRC 8 yes 20%	4 early 13% 0 middle 0% 0 late 0% 2 throughout 6%	1-2 3-4 1 03% 5 17% 4 0 0%	10 11-13 0 0% 4 13% 14-16 16 3 __% 0 0%
Teachers 8 yes 26%	5 early 17% 0 middle 0% 0 late 0% 3 throughout 10%	1-2 3-4 4 13% 5 17% 4 0 0%	10 11-13 1 03% 1 03% 14-16 16 6 20% 0 0%
NUMBER RESPONDING: 31	30	31	31

MASSED MODEL

Participants Who Indicated Value of Follow-Up Support	Participant Indication of Who Should Provide Follow-Up Service	Participant Indication of Number of Visits Required	Participant Indication of Distribution of Support Visits
CRC 7 23%	FSU CRC Other	1 2 03%	2 early 6%
	2 06% 4 13% 0 0%	1 3 03%	0 middle 0%
		3 4 10%	0 late 0%
		0 5 0%	3 throughout 10%
Teachers			
8 26%	FSU CRC Other	2 0 6%	4 early 13%
	3 10% 4 13% 0 0%	0 2 0%	0 middle 0%
		5 3 17%	1 late 03%
		2 4 13%	2 throughout 6%
		2 5 6%	
DISTRIBUTED MODEL			
CRC 6 11%	FSU CRC Other	1 2 03%	2 early 6%
	2 06% 4 13% 0 0%	4 3 14%	4 middle 13%
		0 4 0%	0 late 0%
		1 5 03%	0 throughout 0%
Teachers			
8 26%	FSU CRC Other	2 2 6%	4 early 13%
	3 10% 4 13% 1 3%	4 3 14%	3 middle 9%
		1 4 03%	0 late 0%
		0 5 0%	0 throughout 0%
NUMBER RESPONDING: 31	30	29	29

APPENDIX K

COMPONENT MASTERY TEST AND SUMMATIVE STATUS REPORT RAW DATA

COMPONENT MASTERY TEST AND SUMMATIVE
STATUS SCORE RAW DATA

Raw Data Key

Column(s):

1 - 2 : ID Number

3 : 1 = Massed Trained, 2 = Distributed Trained

4 : 1 = Teacher, 2 = Teacher Consultant

5 : 1 = Male, 2 = Female

6 : 1 = 1-3 years teaching, 2 = 4-7 years, 3 = 8-11 years, 4 = > 12 years

7 : 1 = 25-35 years old, 2 = 36-45 years old, 3 = >46 years old

8 - 79 : Component Mastery Test Questions 1-71, 1 = correct, 2 = incorrect

80 - 98 : Summative Status Report Questions 1-19, 1 = correct, 2 = incorrect

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04	1	1	2	2	1																			
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06	1	1	1	2	2																			
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08	1	1	2	1	1																			
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13	1	1	1	2	1																			
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20	1	1	2	1	1																			
21	1	1	1	1	1																			
22	1	2	1	2	2	1	1	1	1	1	1	1	2	2	1	1	1	1	1	2	2	2	1	2
23	1	1	1	1	1																			
24	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1
25	1	1	2	1	2																			
26	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	2	2	1	2
27	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	2	2	2
28	1	1	2	1	1	1	1	1	2	1	1	1	2	1	1	2	1	1	1	1	1	1	1	2
29	1	2	1	1	1																			
30	1	1	2	2	2	1	1	1	2	1	2	1	2	2	2	1	1	1	1	1	1	2	2	2
31	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2