

1973

# A comparison of two methods of inservice teacher training in selected nonpublic midwestern secondary schools

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A comparison of two methods of in-service  
teacher training in selected nonpublic  
midwestern secondary schools

by

Charles Ellsworth Felton

A Dissertation Submitted to the  
Graduate Faculty in Partial Fulfillment of  
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## THE PROBLEM: IN-SERVICE TEACHER TRAINING

### Introduction

The future belongs to "those who can blend vision, reason, and courage in a personal commitment to the ideals and great enterprises of American Society," declared Robert F. Kennedy as he "saw wrong and tried to right it, saw suffering and tried to heal it, saw war and tried to stop it" (84, p. 3,4). Martin Luther King assured his followers that his "soul was satisfied" because he had been to "the mountaintop" and had caught a glimpse of what could be accomplished in the struggle for human rights. Both men heard "the beat of a different drummer" but were in step with the ancient philosopher-king who stated, "Where there is no vision the people perish" (15).

### Rationale

The time has come, this researcher believes, for educators to catch a vision of that which can be, to make learning a continuing, imaginative, self-fulfilling process, to share hopes and dreams in a community of commitment to that cause. Ideas and ideals, in order to be authenticated, need verification from adequate evidence. In the broad field of education, one area seems almost impervious to change: the improvement of non-public secondary school instruction.

Problems which often make change difficult within nonpublic schools include:

- a. Frequent personnel turn-over
- b. Limited financial resources

- c. Human inertia and fear of change
- d. Lack of evidence that a change may guarantee improved results
- e. Decision-making process rigidly controlled by a bureaucratic hierarchy.

Robert Bush and Dwight Allen (27) of Stanford University, in their book, A New Design for High School Education, published in 1964, struck a major blow for change. The "New Design" was a plan which allowed each student a practical, variable, schedule within the framework of a totally meaningful program, and one in which he may learn at his own pace. To accomplish this purpose, they proposed better use of teacher time and talent, a more relevant curriculum, more efficient use of materials and equipment, and the employment of auxiliary personnel to assist the teacher in noninstructional tasks. With the assistance of Oakford, they also developed a computer program capable of generating a variable master schedule. The rubric "New Design" and all of the teaching-learning strategies which it connotes has been promoted in public secondary schools by a host of innovative principals, college professors with almost evangelistic fervor and myriad salesmen of computer services. At this writing, the teaching-learning strategies of the New Design seem destined to continue and flourish; the "flexible-modular" part (requiring computer assistance) does not. Be that as it may, almost none of the New Design has had an impact on many nonpublic schools.

In a curious mixture of learning theories, ranging from the classical conditioning of Watson to the problem-solving approach of Dewey and the creative behavior model theory of Ausubel, J. Lloyd Trump prepared a



learning systems model in 1961 which included large-group instruction, small-group discussion, and independent study (Trump and Miller, 167). His so-called "Trump Plan" was an outgrowth of research conducted in a hundred United States high schools during the mid-fifties by the Commission on the Experimental Study of the Utilization of the Staff in the Secondary School. The commission, chaired by Trump, was appointed by the National Association of Secondary School Principals and supported by the Fund for the Advancement of Education and the Ford Foundation.

The "Trump Plan" sought to remove two barriers to change in the secondary schools: (a) the inflexibility of class schedules, and (b) inefficiency of staff utilization. A school following the "Trump Plan" would use a time schedule that would provide for three phases of instruction: presentation and assimilation, discussion, and study (102). By the early 1960's, the model was available from either Trump or Bush and Allen and scheduling could be purchased from IBM et al. The remaining hurdle was to convince teachers that the "New Design" was worth the effort.

#### Statement of the Problem

The problem of this study was to develop and test two programs for the improvement of nonpublic secondary school instruction in selected midwestern schools through the use of the components of the "New Design."

More specifically, an attempt was made to answer the following questions and to test the related hypotheses:

Question 1: Is an understanding of improving instruction grasped as effectively by the use of the conventional instruction method as by the use of the learning packages?

Question 2: Does cognitive learning resulting from exposure to conventional instruction or learning packages, persist over a given period of time? (For example: from six weeks to six months later).

Question 3: Which method is more effective with in-service personnel when matched with any of the following eight phases identified by Meeks: philosophy and attitudes, behavioral objectives, large and small-group instruction, independent study, auxiliary personnel or learning packages? (104).

Question 4: Which method is more effective with pre-service personnel when matched with any of the eight phases?

Question 5: Which method is more effective in producing evidence of change in teacher behavior and satisfaction over a given period of time?

To identify answers to the above five propositions, five null hypotheses were proposed as follows:

Null Hypothesis 1: There is no significant difference in learning achievement from using the conventional instruction method or learning packages as measured by the post-tests (after statistically equating for pre-test differences, if necessary) when orienting teachers or teacher-trainees to the New Design.

Null Hypothesis 2: There is no significant difference in the persistence of cognitive learning over a period of time, resulting from exposure to either of the two methods.

Null Hypothesis 3: There is no significant difference in the effectiveness of either method when evaluated in terms of each of the above-mentioned eight phases, with in-service personnel, as measured by the post-tests.

Null Hypothesis 4: There is no significant difference in the effectiveness of either method with pre-service personnel in any of the eight phases.

Null Hypothesis 5: There is no significant difference in the resulting teacher-behavior or satisfaction change over a period of time between the methods as measured by self-reported questionnaires.

It must be recognized that this experiment dealt only with an initial orientation to the concepts and that a continuous in-service follow-up program would be necessary for full implementation in nonpublic schools.

An additional vital objective of this study was the orientation of nonpublic school administrators to the New Design concepts and to determine those concepts which should be included in an orientation program as indicated by tests for significant differences between the two methods used.

Various means of instruction were considered and researched. Two

methods were chosen for testing in this study; namely, the conventional classroom lecture-demonstration approach, and the use of learning activity packages. One-half of the sample would use one mode of instruction and one-half would use the other. A comparison was made between the two patterns of teaching each of the eight New Design phases cited by Meeks to determine if one were significantly more effective than the other.

The conventional instruction approach was chosen to be tested, primarily for two reasons. It is the traditional pattern followed in pre-service and in-service education and it is in conflict with the basic premises of learning packages.

Learning activity packages, used previously in an independent study, were selected as the second approach in the experiment because of their being congruent with the New Design and because of the strong arguments presently being advanced for using this approach with college students.

Postlethwait, father of the audio-tutorial (A/T) approach, has expressed the belief that independent study is effective only to the extent that the learning is done by the learner himself, and that he should be involved as actively as possible in all of his study activities. Since emphasis should be placed upon learning rather than upon the length of time spent, these phases of learning should be unscheduled. Additional help, he feels, should be available when desired. Flexibility of scheduling should allow for adjustments necessary to meet individual requirements. Ninety-eight percent of Postlethwait's students favored the unscheduled A/T approach despite an occasional crowding of the facilities.

Independent study may provide the student with the opportunity to make knowledgeable and positive progress, with the only major limitation being his own skill in achieving the objectives listed. "All sensory inputs can be brought to bear on any given topic and these organized in a logical, sequential pattern" (132, p. 16). Flexibility and diversity are the key components of independent study, according to Postlethwait.

The content for the experiment was developed and adapted from the work of Meeks at Iowa State University. A survey of New Design schools in nineteen states was made by E. Bruce Meeks in 1970 (104). Based on a ninety-two percent return, he found that New Design orientation should include the following phases: philosophy and attitudes, behavioral objectives, team teaching, large and small-group instruction, independent study, auxiliary personnel, and learning packages. Permission was obtained from Meeks to use his learning packages for the independent study treatment; lecture and demonstration materials were developed, obtained, and organized by the present investigator to meet the same instructional goals proposed by Meeks.

### Terminology

#### Learning package or LP

Printed materials designed to teach a given concept or skill and to be self-instructional. Each package contains six parts: (1) the stated concept, (2) the pre-test, (3) the behavioral objectives, (4) the learning activities, (5) the quest activities and (6) the post-test. Little or no direct supervision should be required. A learning package is a student

guide to learning, and may be self contained or it may require additional supplementary materials such as films, filmstrips, books, tapes, etc.

The Meeks packages were limited to printed materials.

### Teacher behavior

Applications in the classroom of the concepts of the eight phases of the New Design under study are observed and reported by the teacher himself. The specific components considered in this study are: philosophy and attitudes, behavioral objectives, team teaching, large-group instruction, small-group instruction, independent study, auxiliary personnel, and learning packages.

### Conventional instruction method

Oral instruction and questioning by the investigator, with utilization of overhead transparencies, supplemented sound filmstrips, movies, small-group discussions, and correlated readings. The time involved was approximately as follows:

Organization, Pre-Test	1.5 hrs
Lecture and discussion	5.5 hrs
Filmstrips and movies	5.5 hrs
Individual readings	2.0 hrs
Post-Test #1	.5 hr.

### New Design

A plan was proposed by Bush and Allen (27) to provide each student with a practical, variable schedule in a meaningful, self-paced program. In this study only Meeks' eight phases were considered. These were: philosophy and attitudes, behavioral objectives, team teaching, large-

group instruction, small-group instruction, independent study, auxiliary personnel, and learning activity packages.

#### Pre-test

Form A of an achievement test which was administered to all participants before any instruction was given.

#### Post-test #1

Form B of an achievement test over the concepts of the New Design which was administered to all participants immediately after the completion of instruction.

#### Post-test #2

Form A of an achievement test, identical with the Pre-test, which was administered a minimum of six weeks after completion of instruction.

#### Post-test #3

Form B of an achievement test, identical with Post-test #1, which was administered six months after completion of instruction.

#### Questionnaire

A device for the recording of each participant's estimate of the following information: the percentage of time spent by a typical student in a given class in large and small-group instruction, and independent study; the percentage of concepts taught to meet behavioral objectives; the percentage of concepts that were team taught; the percentage of concepts taught by learning activity packages, and the use of teacher aides.

### Delimitations

This research was restricted to the problem of developing a program to improve instruction in four selected nonpublic secondary schools. Only the eight phases of the New Design which had been identified already by Meeks (104) were treated, namely, (1) philosophy and attitudes, (2) behavioral objectives, (3) team teaching, (4) large-group instruction, (5) small-group instruction, (6) independent study, (7) auxiliary personnel and (8) learning activity packages (104).

Since only a small target population was available, participants in the sample were limited to 40 pre-service and 52 in-service teachers in midwestern nonpublic secondary schools. Some of the participants had been exposed to certain phases of the New Design, others were totally unfamiliar with this new set of concepts.

Instruction was given to the control group by the conventional instruction method during five workshops where specific time was allotted to this activity. The teaching was done by this researcher who chose not to familiarize himself, at this point, with the Learning Packages which had been developed by Manatt and Meeks (102).

### Sources of Data

During the autumn of 1970 and the spring of 1971 the above-described experiment was repeated five times at different locations. One group contained only pre-service secondary school teacher trainees from Union College, Lincoln, Nebraska, while the other four groups consisted of in-service educators at selected midwestern nonpublic secondary schools. Each group was randomly divided into both a control and an experimental



classification. A pre-test to measure knowledge of the New Design was administered to each participant. One group was taught by conventional instruction; the other group studied eight learning packages which dealt with the designated phases of the New Design. Each participant was given Post-Test #1 to measure his growth in learning during the experiment and to use as a comparison of the achievement of the learning package group with that of the conventional group. Post-Test #2 was administered to all participants six weeks after the completion of instruction to determine the retention of cognitive learning over time.

A minimum of six months later, Post-Test #3 was administered to each subject. A supplementary questionnaire was sent to each person in the sample who was engaged in teaching at that time. Ascertaining the amount of retention and implementation of New Design concepts was the purpose of the use of these instruments. Comparisons were made between the learning package and conventional groups for all participants and within the two subgroups, pre- and in-service personnel in harmony with the stated null hypotheses.

## REVIEW OF LITERATURE

This investigation was concerned with modifying teacher behavior, individually and corporately by a major change in secondary school instructional systems. Pre-service and in-service education activities are the time-honored means of altering teaching practice. Two approaches to pre- and in-service education were compared: conventional lecture-recitation and learning activity packages. Components of the instructional system dubbed "New Design" by Bush and Allen (27) were used in learning content for the experiment. Meeks identified eight separate areas of teacher competency vital to implementation of the New Design; they were: philosophy and attitudes, behavioral objectives, team teaching, large-group instruction, small-group instruction, independent study, auxiliary personnel and learning packages (104). These eight concepts, together with pre- and in-service education of teachers, have been used as an organizational scheme for this review.

## Pre-Service Education

"Teacher education programs have been studied more than researched. Innovations have tended to be implanted and imitated with a minimum of evaluation. Practices and procedures have evolved rather than developed through controlled experimentation. The trend, however, is toward more scientific inquiry (43, p. 1414)."

The focus on improving programs to prepare teachers was initiated by the Commission on Teacher Education of the American Council on Education (1939, 1944) and ranged from theory to rationale. One of the most

striking new conceptualizations in programs to prepare teachers has been the Master of Arts in teaching (M.A.T.) pattern for graduates of liberal arts colleges. Common characteristics of the M.A.T. programs include admission of the candidates to the graduate level, a reduced emphasis on pedagogical studies, the close correlation of professional content with an internship, and increased responsibility of the school systems for clinical experience (43).

By the mid 1960's more than half of the teacher preparation institutions in the United States provided for some interdisciplinary cooperation, the all-institution council being the most common arrangement. Others emphasized the preparation of teachers for inner-city schools and the use of educational technology (43). Cogan's research (1968) indicated a strongly emerging trend toward a diminution of formal professional course work in teacher education in favor of closely supervised student teaching (35).

Writers have offered several propositions for improving teacher training such as: (1) greater cooperation between schools and teacher education institutions (141), laymen, students, regional and state educational agencies (51), including professional educational organizations (74), in the preparation of teachers who would yield a better preparatory program and product (126); (2) more careful and appropriate selection of persons entering the profession is vital corollary to the preceding proposition (128,141,161); (3) an adequate experimental background is basic to personal commitment and meaning, and to successful educational and vocational decision making (141); (4) opportunity for

some teaching and a limited study of educational theory while in high school is considered valuable as is early and continued involvement with children and schools (40); (5) practical experience should be available to help prospective teachers deepen their understanding of cultural diversity, minority groups and human relations, economic, political, and social cross sections of living (141); (6) each pre-teaching student should give evidence of paid work experience, and at least a fifty-hour leadership training experience (40); (7) integration and mutual reinforcement of educational theory and practice, a clinical approach, for producing teachers capable of demonstrating what they had learned is a vital concept (98, 141, 145, 151, 161).

A teaching education center, staffed by a team of public school personnel, university personnel, and other specialists sought to integrate theory and practice at Indiana State University. Their program featured (1) prescribed visitation time, (2) team planning cycle, (3) center learning sessions, (4) cooperative exchange, and (5) dissemination activities (106).

A professional year for juniors and seniors, teaching and/or administrative internships are three other possibilities of teacher education preparation. This is a program of partnership between the theorist and the practitioner (140).

Secondary teachers should be well prepared in subject area content with continuing vertical articulation of study and practical experience across all levels, as well as general education in the liberal arts. The structure of the given discipline, its relationship to that of cognate

fields and its pertinence to life problems is very important for motivation, effective learning, and creatively humane application (125). The methodology used by those who teach the major courses makes a heavy impact on the performance of teacher trainees; for that reason, strategies which have been tested pragmatically should be modeled, (106, 141) as well as experimental teaching methods which envision schools that do not now exist (83).

Three research studies concerning pre-service teachers and their response to certain phases of the New Design provided mixed findings. Neither the use of learning packages, programmed instruction, team teaching, nor independent study generally resulted in significant differences in achievement or attitude (7, 46, 63, 152). However, Elich found that students judged independent study to be more efficient (46). Siemankowski reported elementary teacher trainees who were exposed to auto-paced teaching (a combination of team teaching, large-group instruction, programmed learning, audio-tutorial instruction and independent study) achieved significantly higher in geology, but not astronomy. The time used by the experimental group was 28 percent less than the control group; their attitude toward science was significantly better, also (152).

The Association of Classroom Teachers and others have called for Performance Based Teacher Education (P.B.T.E.); that is, the preparation of teachers in a program that focuses all learning on the person. "The individual, whether teacher or learner, is goal oriented. . .The teaching-learning process is facilitated if the teacher knows what he wants the pupil to learn and if the learner is aware of precisely what is expected

of him or what he expects of himself. Precise knowledge of results also enhances learning" (74).

Instructional modules or learning packages are recommended as one approach to P.B.T.E. (51, 103). Some implications for teacher training institutions are: nonpunitive gaining, supervision by objectives, modular scheduling and staff modeling example of master teaching (81). Responses were highly favorable from interns with whom the instructional packages approach was used (165).

Others see the competency or performance movement in teacher education as "but one response to the preparation of teachers. Insofar as it has helped students gain the assurance that they can function in an instructional setting because they have mastered a variety of teaching skills, its effect has been benign. But when it has underplayed or ignored the personal, educational and social reform desires of its training constituency it has done nothing more than perpetuate the status quo" (113, p. 156).

Iannone and Carline have called for a humanistic approach to teacher education. They want a teacher with such qualities as spontaneity, acceptance, creativity, and self actualization who is true to his own feelings and knows how to help children realize their full potential (78).

A synthesis of behaviorism and humanism is seen by others as the program for teacher preparation; because teaching is intentional, goals do exist. Humanists wish to break the pattern of fear, boredom, dependency and alienation which has grown up in our schools. In essence they have

indicated directions and rationale for those directions. The traditional weakness of humanists has been "their inability to specify assessable goals and to use assessment in evaluating instructional strategies. Where the humanists have been strong (direction of goals and rationale), the behaviorists have been weak; where the humanists have been weak (stating measurable goals and assessment) the behaviorists have been strong" (36, p. 174).

A synthesis of humanism and behaviorism is possible "and very much needed" (36). One application of these concepts might be the serious study of lives and thoughts of great educators (1). Improvement of student teaching has been a favorite research topic for decades. The caliber of the cooperating teacher with whom the student teacher works is a critical factor. A quality of excellence in the model tends toward excellence in the beholder (141). In one study of the cluster plan (several student teachers assigned to the same school under the supervision of generalists rather than specialists) it was found that the student teachers rated the generalist as significantly more effective than the specialist in helping with teaching skills such as planning objectives, giving directions, questioning and classroom management. Generalists were rated equally as effective as specialists in the help which they gave with the subject matter that students taught (147). Microplanning, a treatment designed to help prospective teachers perform pre-tutorial teacher behavior effectively, consists of six competencies: rationale, behavioral objectives, knowledge structure, selecting content, teaching methods, and teaching actions. The reported results suggested that microplanning produced greater pupil achievement in using subject matter to solve problems and

did not produce undesirable attitudes (170).

A spiral approach to teacher education has been advanced. This plan provides for a meaningful educational structure built around pertinent sequential concepts (134). In another study, the use of reading materials was compared to the seminar experience in assisting student teachers acquire information dealing with discipline and lesson planning. The use of reading materials was more effective at the 0.01 level than the student teaching seminar (173). The fifth year program in which a student teaches a partial load is another possibility for consideration; time for relaxed study, materials and technique development, team planning, and creation of new instructional approaches is provided (141).

At Georgia State College, a pre-service education course is offered which consists of four phases and student teaching. Phase I focuses upon establishing organizational bases for teaching; Phase II on audio-visual materials and usage; Phase III on interviewing adolescents, use of school records, teaching and evaluating five to eight students; Phase IV on special concerns, such as management, the disadvantaged child, mental health and counselor-teacher relationships (29). Stanford University's Teacher Intern Program, a 12-month graduate program of teacher education which builds upon the opposite end of the training cycle, involves "continuity study in six areas: (1) practice in teaching, first micro-teaching (a series of scaled-down teaching experiences prior to full-fledged practice or intern teaching) and then two classes for the academic year; (2) the scientific, behavioral foundations of education; (3) procedures in curriculum and instruction in major teaching field;



(4) secondary education; (5) academic major; and (6) self-criticism and evaluation of teaching with a tutor-supervisor assigned for the 12-month period. The interns are also supervised by a resident supervisor, who is given released time, extra pay, and recognition as a university staff member. Various kinds of ongoing research and experimentation have been incorporated into the program. Along with the microteaching, video recording and 35 mm time-lapse photography have been used for studying and modifying teaching behavior. The Stanford Teacher Competence Appraisal Guide has been developed and used in the measurement of teaching effectiveness; automated data-processing procedures have been used for their analysis and summary" (5, p. 1520).

On-site teaching is another proposed approach. In this arrangement, the methods instructor is assigned concurrently as the student-teaching supervisor for his section. At least some of the instruction takes place at a school where students are doing practice teaching. The students are provided with these experiences over two semesters with two different instructors (107). Variations of this plan have been advanced by others (62, 93, 136, 163).

It is suggested that renewal centers, as opposed to colleges of education, could involve more teachers and teacher organizations. The staff of such a center according to theorists of the Office of Education should include everyone from teacher aide to senior professor as well as community laymen and agencies; it should be governed by those who use it. Study and research should be an integral part of the operation (44).

Teacher preparation programs may include a wide variety of experiences and formats ranging from the conventional classroom learning followed by

student teaching, to such possibilities as phase training, teacher education centers, a professional year, internships, the spiral approach, the cluster plan, a fifth year program, P.B.T.E. and learning packages. The use of learning packages as compared with conventional instruction was the strategy chosen for testing in this study.

#### In-Service Education

The importance of continuing integration and articulation of educational theory with practice, following induction into teaching is recognized throughout the literature. Professional growth may be encouraged through follow-up, in-service and graduate study experiences (43, 141).

A shift in locus and responsibility to the public school while increasing the linkage with other related programs is seen as two of the current major needs in teacher training. Emphasis on the career ladder under carefully coordinated administration, instruction and supervision in the field setting with maximal performance-based individualization of training and optimal use of group resources to integrate curriculum and research in interdisciplinary seminars briefly summarize this proposal (126).

The laboratory approach is another possible pattern for in-service education. This strategy provides for involvement in stimulating realistic experiences with which individuals with diverse needs and interests can identify (65).

Research indicates that teachers prefer in-service experiences in the following descending order: interclassroom visitation, individual in-service conferences with specialists, directed professional reading, county and state workshops, local workshops, and faculty meetings (20).

Teachers consider higher education classes on a par with interclassroom visitation as to effectiveness of in-service experiences (160). In-service, ideally, ought to be a collaborative sharing of ideas, separate from salary or tenure, and/or professional advancement, and offered by a third party separate from teachers or administrators (142). Teachers are most receptive to innovations and in-service experience which: (1) provide for variability in group size and time allotments (41), (2) are related to their immediate day-to-day instructional concerns, (3) involve teachers in leadership activities, (4) are evaluated in terms of their effectiveness and (5) include teachers in the activity planning (117).

In-service demonstrations do change teacher behavior (32, 64). Teachers must be granted the "right to creative failure," however, as a means of insuring imaginative professional behavior (92).

Parents, administrators and teachers--but not students--"are both the most commonly cited obstacles to and facilitators of educational change. Working effectively with people appears to be the key to successful innovation and change, particularly when the 'unknown' is involved" (110, p. 339).

#### Philosophy and Attitudes

Excellence in education is the goal of the "New Design," according to Bush and Allen (27), a concept first offered by them in 1964.

This design for secondary education should strike a balance between curricular requirement and free-choice electives; it not only should guarantee the absence of significant gaps in the education of any pupil but also take adequate account of that pupil's individuality. The ultimate

goal should be the optimum self-fulfillment for each learner. This design should provide flexible arrangements for a multiplicity of alternative learning experiences and should consider a pupil's indifference to the learning process, as well as those unique talents and specialized competences of teachers. Further, differences in the subject fields must be recognized (27, 60, 61, 102, 167, 168).

"Other innovative aspects of organization have dealt with such matters as 'ungradedness' (Brown, 1968; Beggs and Buffie, 1967), team teaching, independent study, large and small-group instruction, and so-called flexible scheduling (Trump and Baynham, 1961). The latter innovations are clustered under what has been called the 'Trump Plan'...." (43, p. 1215). Actually, the "Trump Plan" was a forerunner of the model proposed by Bush and Allen.

Robert Howsam, Dean of the College of Education, University of Houston, summarized the attitude and philosophy components of the New Design, the Trump Plan, and almost 15 years of experimentation in secondary schools with his model of Performance Based Instruction (P.B.I.). Essentially, he is saying that all educators working in this movement think that all learning is individual and that the process is facilitated by:

- I. The elements of the performance-based approach
  - A. Precise objectives
  - B. Performance criteria
  - C. Instruction pertinent to the criteria
  - D. Learner accountability

- II. P.B.I. is implemented by the following enhancers
  - A. Individualized and personalized instruction
  - B. Modularized instruction
  - C. Multiple-alternative learning opportunities
  - D. Use of open-space concept
  - E. Use of technology
  - F. Instructional teams
- III. Less essential, but important considerations for P.B.I. includes the enablers of:
  - A. Application of the systems approach
  - B. Participative management
  - C. Effective teacher personnel procedures
  - D. Management by objectives (74)

#### Behavioral Objectives

During the early 1950's, Bloom and others (following the example of the hard sciences) developed a taxonomic approach to the classification of educational goals. Since that time, much emphasis has been placed upon writing precise instructional objectives in three domains, the affective, the cognitive and the psychomotor (17).

An analysis and specification of educational objectives and outcomes are the most important factors in improving educational attainment. The definition of instructional objectives, derived from concepts to be learned, serves as a guide toward goal attainment for the curriculum designer, teacher, and student (58, 101). Mager supports this position and also says that unless goals of a course are stated clearly, tests are

misleading, irrelevant, unfair or useless (100). Effective behavioral objectives must include a statement of terminal behavior, performance conditions, and identify a successful level of performance.

Behavioral objectives may serve as a guide in the selecting of subject content material, sequence of instructional modes, evaluative techniques, and curricular experiences (5, 100, 102, 111). Students should be included in the formulation and/or the selection of these objectives (14, 99, 118, 127) in order that the learning may be personally meaningful. However, "determining if certain objectives have or have not been achieved is an empirical problem. By contrast, the selection of desired outcomes is a value problem. Curriculum developers must be careful to distinguish between the 'ought' question of selecting objectives and the 'is' question of assessing the attainment of objectives" (127). However, it is most important that the evaluative instruments measure the identical behavior specified in the objectives (108).

While much debate exists between those who promote behavioral objectives (56, 100, 102, 131) and those who do not believe in behavioral objectives (87, 133), the consensus appears to be that teachers should use mostly behavioral objectives. This trend probably will continue for the rest of this generation (56, 81, 85, 100, 102, 124, 131, 155). Jordan found no significant difference in learning with or without behavioral objectives (82); however, Smith did find a significantly higher retention of knowledge when behavioral objectives were used (155).

Studies dealing with the informing of students concerning behavioral objectives prior to actual instruction, generally reveal no significant

difference in performance although Cook did find a higher resistance to forgetting by those who had prior knowledge of behavioral objectives (16, 18, 25, 37, 105, 157, 174). In contrast, some researchers have found that those who had prior information of behavioral objectives enhanced their achievement significantly (89, 114). McGovern found that teachers who participated in an in-service training course on the formulation and use of behavioral objectives were significantly more favorable to their use and made significantly greater use of them than did those teachers who studied from a programmed text (97).

#### Team Teaching

One of the fundamental phases of the "New Design" is "team teaching," a term which "applies to an arrangement in which two or more teachers and their assistants, taking advantage of their respective competencies, plan, instruct, and evaluate in one or more subject areas a group of elementary or secondary students equivalent in size to two or more conventional classes, using a variety of technical aids to teaching and learning through large-group instruction, small-group discussion, and independent study. If one of the foregoing ingredients is missing, it is not team teaching" (167, p. 318). According to purists such as Trump, a more pragmatic definition has evolved recently which would allow a teacher and a paraprofessional aide to be called a teaching team. Bailey and Benesch developed multi-level team teaching which consists of a teacher, a teaching assistant and a student assistant (9).

Myers and others reported that team teaching provided the following advantages:

1. More course material is covered more effectively
2. More efficient use is made of teacher time
3. Greater student interest and motivation
4. Greater individualization is accomplished
5. Teaching quality is upgraded (112)
6. Students benefit from broader knowledge and expertise
7. Students develop greater ability (53).

Team teaching, when united with flexible heterogeneous grouping, has developed significantly better student attitudes (144). Students have regarded teachers who had been prepared as teams significantly more favorably than solo trainees (6, 179).

In contrast to the findings just stated, Olosky and Smith rated team teaching a failure among the major change efforts of the past 75 years (121). Difficulties cited in team teaching were:

1. Personality conflicts
2. Letting "George do it"
3. Faculty load identification (112).

A majority of those who had tried team teaching and had dropped it gave unfavorable student reaction as the reason in a survey by Falkenstein. On the contrary, 83.3 percent of the districts still engaged in team teaching, said that their reason for continuance was favorable student acceptance (50).

Until the late 1960's, the research on team teaching was not very rigorous and therefore, uncertain of interpretation (43). Since then several studies have compared the results of team teaching with traditional



teaching and have found no significant difference in recall or recognition achievement (7, 49, 55, 95, 139, 181), nor in frequency of misbehavior (176). One study, however, did show significantly higher achievement in a team teaching situation than in conventional classes (57). Fraenkel also found team teaching significantly more effective in teaching students to answer questions requiring reflection (55).

A massive, nation-wide study by Millard and Manatt of teaching teams which have persisted three years or more, revealed several organizational factors which contributed to team permanence: method of assignment to teams, time flexibility, preparation for teaming and use of aides (109).

#### Large-Group Instruction

One important strategy in team teaching is large-group instruction which refers to teacher-planned presentations either provided by the teacher himself or by the talking of some other person or a film or a recording (167). Trump presently recommends 50-150 students in each large group for the Danforth Foundations Model Schools Project.

A search of the literature revealed limited findings with specific reference to large-group instruction per se although a great deal has been learned about large-group instruction as a bi-product of studying team teaching. Large-group instruction, if considered as lecture, can do more than transmit knowledge. It can be used in teaching higher cognitive processes, such as attitudes. Further, it can be used to provide a mode of a person thinking (43).

Two studies showed no significant difference in achievement when large-group instruction was used (13, 54), but in the former study, a

significant decrease in teacher load resulted. Other researchers found large-group instruction significantly more effective than conventional teaching but statistical treatment levels were not stated (31, 178).

#### Small-Group Instruction

Small-group discussions (5 to 15 persons) provide opportunities for students to talk over "controversial matters, to communicate effectively, to listen to and respect the opinions of others, and to deal with people whose backgrounds and interests differ from their own. The discussions use and reinforce some of the knowledge the pupils gain in large groups and independent study" (166, p. 281). The teacher's role is that of an organizer and provocator of learning (2, 23, 94, 102, 120).

In ten studies, McKeachie found significant differences between discussion with greater instructor dominance in areas such as: ability to apply concepts, in attitudes, in motivation, and in group membership skills. Since the transmission of objective knowledge is faster in lecture than in discussion, he recommended a combination of large-group lecture and small discussion sections (2, 43). Other writers generally support the suggestions made above but some would reduce the group size from 15 to 3 students emphasizing the participation of each group member.

The small group is one of education's most important innovations. . . . Through small groups, opportunities for pupil-teacher interaction can be multiplied and that is where very significant kinds of learning take place (102, 123).

A significant factor in small-group discussion is the make-up of the group according to sex. Girls' academic performances were significantly affected by their position in the peer groups, by friendship with the teacher and by the level of perceived parental support. Boys were influenced significantly by only the first two factors (146).

Class size was found to be particularly important in achieving quality of instruction. On the secondary level a critical "break point" occurred at the 16:1 student-teacher ratio. Above this level, performance scores dropped sharply. "Style of educational activity was the single strongest overall predictor. Particularly high scoring styles (as evaluated by the "Indicators of Quality" technique) were small-group work, individual work, discussion, laboratory work, pupil report and demonstration" (123, p. 64).

The threat of a grade in an oral quiz session as part of audio-tutorial instruction made no significant difference on the amount of material learned (77). Groups learned content equally well with those who received individualized instruction in Bartsch's study (10) but small-group students were significantly more accurate in specific and comprehensive information (10, 148).

#### Independent Study

Independent study provides the student with the opportunity to make knowledgeable and positive progress with the only limitation being his own skill in achieving the objectives sought. "All sensory inputs can be brought to bear on any given topic and these organized in a logical, sequential pattern" (132, p. 16). Flexibility and diversity are the key

components of independent study.

There are two dimensions of independent study for most students: basic education for mastery of minimum essential knowledge, skills and values, and depth education for the exploration of special student interest and talents (48, 166).

Independent study, in some form, should be available to all students; it helps the student to best fulfill his potential as he becomes more and more self-directed (48, 60, 169). The question to be answered is not, "Is everybody happy?" but rather, "Is everybody learning?" (3). Not only should students know how to learn but they should be willing to accept the major responsibility for their own learning and hopefully learn for the sheer joy of it (23). Too often, independent study is too prescriptive and lacking in variety (158); however, students generally react favorably to it (91).

Independent study time could range from 15-70 percent of a student's day (102). It emphasizes an intimate diagnostic and prescriptive opportunity for both student and teacher. This means individual freedom within prescribed guidelines (96).

In Smiley's study, upperclassmen studied more during unscheduled time than lowerclassmen; females used resource centers more than males with the reverse being the case with library usage. Free time was often used for nonacademic activities but generally the students acted responsibly (153). In a review of thirty studies, the overall research suggested that self-directed study methods are useful in promoting information learning and result in more favorable concomitant learnings such as

attitudes, interests, and motivational action-tendencies than in a traditional classroom experience (71).

Three studies of college students showed no significant difference in achievement between independent study and conventional treatment. Students rated self-directed study as more efficient and positive (34, 46, 52, 88, 149); however, two showed significant improvement in critical thinking reading as a result of independent study (52, 88).

#### Auxiliary Personnel

The employment of teacher aides, sometimes called auxiliary personnel, is currently the most frequently adopted educational innovation (135). The typical aide is a paid, young-to-middle-aged, married mother with 12 to 14 years of formal education and some prior experience with children (47, 72, 177).

An aide may supervise small groups, play educational games with children, quiet an upset child, interest a restless child, prepare instructional materials, help students to improve learning skills, help to reduce discipline problems and provide added instruction time for the teacher (138). She may also engage in routine housekeeping chores such as: taking attendance, recording grades, checking objective tests, assisting librarian, helping with audio-visual equipment, selling meal tickets, and a host of other things. An aide may not diagnose, prescribe, nor evaluate learning needs and experiences (102).

Smith found the following factors significantly important in total job performance of an aide: interest in children, leadership qualities, ability to accept criticism, and marital status (156). Thompson's study,

on the other hand, predicted, with statistical significance, successful teacher aides from nonaggressive, tranquil follower types (162).

Generally, teachers, secretaries and administrators favorably perceived teacher aides (42, 78, 119, 138). However, the employment of aides has caused role changes for teachers and secretaries, placing them into middle-management roles (150).

Some of the recommended pre-conditions for successful auxiliary personnel programs are:

1. Role definition, development and training for aides.
2. Training of teachers and administrators in the use of aides.
3. Permanent integration of auxiliary personnel into the educational system.
4. Advance determination and organization of goals and procedures (11, 21, 70).

In one study, teacher aides had no significant influence on student achievement; however, they did stabilize the way pupils saw their teacher as one who would help them individually in education (90). In another study, teachers, with aides, did not spend more time in the teaching act itself, as traditionally conceived, but did spend more time with small groups, did use a higher frequency of supportive verbal expressions and used methods with involved students in more active roles (38).

Students, with teachers and aides, did significantly better in reading readiness but not number readiness (12). Additional reinforcement of attention, as provided by a teacher aide, seemed to lengthen children's attention span; however, nonsignificant differences in achievement resulted (67).

### Learning Packages

Research relating to learning packages has been sparse until recently. "A learning package is a modular instructional unit intended to facilitate the individualization of instruction" (102, p. 174). The learning package is learner-centered and is based on two major premises, both of which are validated by research: (1) students learn at different rates; (2) learning is incremental. Generally, the learning package is a form of programmed instruction. Five essential elements generally included in learning packages are:

1. Concepts
2. Behavioral Objectives
3. Multidimensional learning materials and activities
4. Pre-, self-, and post-evaluation, and
5. Quest or self-initiated learning (102).

Learning packages were equally as effective as conventional teaching in six studies cited (19, 63, 75, 137, 154, 180). In Pope's study, there were no significant differences in attitudes or in teaching performance (130). On the contrary, five studies rated learning packages as superior to conventional teaching as a mode of learning (30, 104, 129, 130, 172). Meeks, Peterson and Pope found significant achievement differences in favor of learning packages at the following levels respectively: .10, .001, .01. Meeks also found a highly significant improvement of opinion toward learning packages after use (104).

Recently, Timmerman at Iowa State University found a sex interaction operant when the effectiveness of written learning packages was compared

with Postlethwait-type audio-tutorial type instruction. Outcomes for each treatment group were approximately the same; however, a significant number of girls favored the use of written packages. In discussing this finding, Timmerman suggested that this difference could be a result of the girls' preference for studying in their rooms rather than going to the university media center which was located some distance from the residence halls (164).

#### Reactions to the New Design

Education is individualized to the extent that an individual's learning goals and the means by which he seeks to achieve them are selected for and by him (68). Olsen's study indicated that high school students favored the personnel concepts, the learning methods and curricular recommendations of the "Trump Plan." Girls were more favorable than boys, seniors and graduates than freshmen and sophomores, above-average intellectual ability students than those below average and students from the school with least number of those culturally different than those from the other two schools included in the study (122). However, Huntington concluded from his study that students enrolled in innovative schools did not have more positive attitudes toward their institution than students in noninnovative school programs (76).

In comparing reactions to the New Design, those studies which appeared to include most of the phases of the "Trump Plan," audio-tutorial or individualized instructional and/or audio-tutorial programs were reviewed. Students achieved as well in five New Design programs as they did under conventional teaching (24, 28, 39, 79, 80); however, Davidson also did



point out that independent study and small-group discussions freed the teacher to help the less able students (39). Individualized instruction when accompanied by reading and reacting to progress data in the student's presence increased the student's performance significantly (69).

Students in other studies performed significantly better with individualized instruction than with conventional procedures: (22, 26, 45, 116, 152, 159, 171). Researchers Bull, Edwards and Siemankowski found significant differences at the following statistical levels respectively, .05, .025, .05. Broussard found significant differences in computational and arithmetic skills but not in application of skills (22). Significant differences were found in geology and astronomy but not in meteorology (152).

When flexibly scheduled schools were compared to those with traditional organizational plans using the Iowa Test of Educational Development, flexibly-scheduled students scored higher on interpreting reading materials in the social sciences, natural sciences, and literature while students taught traditionally scored higher on Correctness and Appropriateness of Expression and General Vocabulary (66). Traditionally-taught college biology students were significantly superior in overall achievement when compared to those who were taught audio-tutorially (143).

The New Design (Trump Plan or Performance Based Instruction) is not a perfect remedy in and of itself, but its successes, so far, seem to warrant continued experimentation. Plans and ideas succeed only if people (in this case administrators, aides, teachers, and students) activate them--talking about change is not enough.

## METHODS AND PROCEDURES

The purpose of this study was to develop and test two in-service programs for improving nonpublic secondary school instruction by teaching eight phases of the "New Design" identified by Meeks. The teaching strategies of the "Trump Plan," as far as it was practical were contrasted to instruction via eight learning packages developed by Manatt and Meeks. The packages are on file in the Educational Administration section of the College of Education, Iowa State University of Science and Technology. The study was designed to test the hypothesis that both of the above-mentioned methods were equally effective in teaching each of the eight designated phases of the "New Design." Repeated testing of the same subjects was conducted to determine if cognitive learning and behavior change persisted over a period of time. This chapter describes the methods and procedures used to gather and analyze the required data. There are five sub-sections in this chapter: (1) sample selection, (2) description of materials used, (3) orientation, execution, and review, (4) testing, and (5) data analysis.

### Sample Selection

Five, three-day workshops were conducted, one for pre-service and four for in-service teachers who had expressed some interest in learning and using the concepts of the "New Design." The pre-service group were upper division secondary teacher education students of both sexes at Union College, Lincoln, Nebraska. Classroom teachers and administrators of four midwestern Seventh-day Adventist secondary schools participated

in workshops conducted on their respective campuses. The cooperating schools were Sheyenne River Academy, Harvey, North Dakota; Mile High Academy, Denver, Colorado; Oak Park Academy, Nevada, Iowa; and Maplewood Academy at Hutchinson, Minnesota.

Forty pre-service and fifty-two in-service persons were assigned to the experimental and control groups, by the use of the table of random numbers. Each of the five workshop groups was divided in this manner.

#### Description of Materials Used

Each of the workshops was conducted in the following format. Two slight variations which occurred are noted at the close of this section.

#### New design workshop

<u>Activities</u>	<u>Approximate Time</u>
1. Pre-test and Organization	60 min.
2. Film "No Bells Ring"	60 min.
3. Film "Make a Mighty Reach"	45 min.
4. "Mission Is Possible" (Large-Group Instruction followed by Question-and-Answer Period)	75 min.
5. Filmstrips: "Focus on Change" and "Focus on the Individual" (Independent study in simple carrels)	30 min. 30 min.
6. Vimcet Filmstrip "Educational Objectives" (Large Group with response sheets); (Small-group discussion)	30 min.
7. Vimcet Filmstrip "Selecting Appropriate Educational Objectives" (Large group with response sheets) (Small-group discussions and writing of behavioral objectives)	30 min.

- |   |          |
|---|----------|
| 8. "Flexible Scheduling" (Large-group instruction) (Discussion)   | 30 min.  |
| 9. "Large-group instruction, small-group discussion, independent study" (Large-group instruction; Discussion of preceding phases) | 30 min.  |
| 10. "Team Teaching" (Large-group instruction; discussion of preceding phases)   | 30 min.  |
| 11. "Differentiated Staffing, Teacher Aides" (Large-group Instruction)  | 30 min.  |
| 12. "Learning Packages" (Large-group Instruction) (Guided Independent Study in writing concepts and behavioral objectives)        | 30 min.  |
| 13. Film "Rx for Learning"  | 30 min.  |
| 14. Reading of at least six "multicopy handouts" from fifteen available from the beginning of the workshop. (Independent study)   | 120 min. |
| 15. Review. Conducted in Lecture with transparencies. Question-Answer format.   | 60 min.  |
| 16. Post-Test #1  | 45 min.  |
| 17. Quest Projects (optional). Reading other articles. Film "The Improbable Form of Master Sturn" (Discussion)                    | 30 min.  |
| 18. Post-Test #2 (Six weeks after Post-Test #1)   | 30 min.  |
| 19. Post-Test #3 (Six months after Post-Test #1)  | 30 min.  |

At Sheyenne River, through a shipping error, the film "Charlie and the Golden Hamster" was of necessity substituted for "The Improbable Form of Master Sturn." Also "Selecting Appropriate Educational Objectives" was not used. At the Maplewood workshop, "Rx for Learning" was unavailable.

### Learning packages

Manatt and Meeks polled 106 selected innovative schools in the United

States, which had been so designated by key national educators. Their purpose was to discover instructional technology needed by teachers of such schools. From a possible 19 concepts, the eight most frequently mentioned were chosen for learning package presentation. These eight packages were used as the alternative treatment in this study. Each package contained: (1) Concepts and sub-concepts, (2) behavioral objectives, (3) pre-tests, self-tests, and post-tests, (4) learning activities, and (5) quest activities (104).

#### Other materials

To measure the cognitive learning achievement, pre- and post-tests were developed to measure the cognitive learning of each student at each phase of the treatment. The criterion-referenced tests developed for the Meeks investigation were used in this study.

One hundred eighty questions were written which measured the performance levels prior to the treatment and at the end of the study. The questions were of the multiple choice and true-false nature. By using a table of random numbers, the 180 questions were divided equally into two groups. Robert L. Thorndike and Elizabeth Hagen's book, Measurement and Evaluation in Psychology and Education was used as a guide for establishing validity and reliability in the tests. One set of questions was used as a pre-test and the other set was used as a post-test. Experimental practices were tested by a judgment panel knowledgeable in the New Design.

Certain personal descriptive data were recorded on the answer sheet of the pre-test. These data were: (1) sex, (2) teaching experience, (3) was the individual teaching in an innovative school, (4) grade level, (5) position, and (6) attendance center (104, p. 42).

A twenty-one-item "Educational Practices" questionnaire was devised to determine which was the "favorite" class that each teacher preferred to teach, before the workshop, (fall of 1970) and the reasons for that

choice. The actual prior use of the eight New Design phase was researched ex postfacto as to the fraction of time used and the satisfaction with each component.

After a period of time had elapsed, a New Design follow-up questionnaire was sent. In most instances, the first questionnaire had been returned before the second was sent. The purpose of the second questionnaire was to determine if there had been a change in the experienced teacher's favorite class practices after the workshop and, if so, the reasons for the change. Questions were asked regarding the New Design practices being followed (spring, 1972) in terms of phases employed, percentage of time used, and satisfaction with each. A self evaluation of one's effectiveness and enjoyment in usage was sought as well as identification of areas with which help was most needed.

Care was taken to design the instruments to be different in appearance format, sequence and vocabulary. Before submitting an instrument to respondents, each was checked by a judgment panel, pilot tested, and refined.

#### Orientation, Execution, and Review

In each workshop, participants were introduced to the purposes of the experiment at the first meeting (testing the effectiveness of New Design concepts through the method of conventional teaching as opposed to that of learning package usage). The need of this research, it was explained, was to develop learning programs to help meet the critical fiscal and staffing needs of small nonpublic schools. The nature and duration of the experiment, testing procedures, and assignment to treatment groups

were also explained.

Following the orientation and random assignment of the participants to their designated groups, form A of the test, consisting of ninety objective questions, was administered. Subjects were asked not to communicate with each other about the New Design during the workshop, in order to reduce the possibility of experimental contamination.

The format, concept selection, and authorship of the packages were explained and discussed with the experimental group. Each participant was furnished with a set of the eight packages to be completed by the close of the workshop. Members of the experimental group did not attend the classes where the New Design concepts were taught conventionally; but both groups attended a short review session, just prior to the administration of the first post-test.

### Testing

The testing, as indicated above, was done in five different stages. Pre-testing was done at the first meeting of each workshop. Post-test number one (Exam B), to measure growth, was administered during the last session of the third day of each workshop. A variation in scheduling was necessary for the workshop conducted at Union College. While each of the other four workshops met on portions of three consecutive days, this one met on a Sunday and the following Wednesday and Sunday.

Post-test Number Two, (Exam A) intended to measure retention, was administered by mail at least six weeks after Post-Test Number One. Post-Test Number Three (Exam B) designed to measure the forgetting factor, was mailed to the participants after a minimum time lapse of six months.

Answers for all tests were put on hand-punched cards and computer scored. The Educational Practices questionnaire was sent with Post-Test Number Three and the New Design follow-up was sent after a time lapse of at least two weeks.

#### Treatment of Data

The relative effectiveness of learning packages compared with conventional instruction in teaching educational personnel the concepts of the New Design as measured by pre- and post-tests, was the primary objective of this experiment. Provision was made, on two occasions, to test the retention of concepts over a period of time, the behavior change and preferences for the eight phases totally and individually. The experiment was also used to determine if there was any significant difference among pre- and in-service personnel in regard to how they learn and accept this teaching learning strategy. Because of the exploratory nature of this study, it was determined to test at the 0.10 level of significance.

Hypotheses one through four were tested by the use of an analysis of variance split-plot design and Scheffé's S Method. Data were processed by computer according to procedures outlined by Kirk (86), Chamberlain and Jowett (33) as well as Nie, Bent and Hull (115).

Hypothesis five was analyzed descriptively and was tested by techniques for the student t as proposed by Wert, Neidt and Ahmann (175).



## FINDINGS

Five questions and their related hypotheses concerning the improvement of instruction in selected nonpublic secondary schools have been presented in this study. The purpose of this chapter is to present the resultant findings of that investigation. Null hypotheses will be discussed in this chapter while the questions will be considered in the next. Null hypotheses one through four were tested by the analysis of variance split-plot design, using unweighted means; this design provided for the analysis of unequal numbers in the subgroups and unequal numbers of questions in the instrument used to measure the knowledge of the various New Design components with two different test forms (see Appendix A).

Kirk describes the split-plot design as follows:

Subject heterogeneity is the rule rather than the exception in behavioral research. The randomized block design described earlier enables an experimenter to partially isolate the effect of subject heterogeneity in testing treatment effects. This is accomplished by using matched subjects of repeated measures on the same subject. In a randomized block design, blocks of subjects are composed in such a way that variation among subjects within each block is less than the variation among blocks. A split-plot design with repeated measures or matched subjects represents an extension of this principle to experiments having two or more treatments. This design is appropriate for experiments that meet, in addition to the general assumptions of the analysis of variance model, the following conditions:

1. Two or more treatments, with each treatment having two or more levels, that is,  $p$  levels of  $A$ , which is designated as a between-block or nonrepeated-measurements treatment, and  $q$  levels of  $B$ , which is designated as a within-block or repeated-measurements treatment, where  $p$  and  $q \geq 2$ .
2. The number of combinations of treatment levels is greater than the desired number of observations within each block.

3. If repeated measurements on the subjects are obtained, each block contains only one subject. If repeated measurements on the subjects are not obtained, each block contains  $\underline{q}$  subjects.
4. For the repeated-measurements case,  $\underline{p}$  samples of  $\underline{n}$  subjects each from a population of subjects are randomly assigned to levels of the nonrepeated treatment (A). The sequence of administration of the repeated treatment levels in combination with one level of the nonrepeated treatment is randomized independently for each block. Exception to this procedure is made when the nature of the repeated treatment precludes randomization of the presentation order.
5. For the nonrepeated-measurements case,  $\underline{p}$  samples of  $\underline{n}$  blocks of  $\underline{q}$  subjects from a population of subjects are randomly assigned to levels of treatment (A). After this, levels of treatment (B) are assigned randomly to the  $\underline{q}$  subjects within each block (86, p. 245).

#### Computations Procedures for Unweighted Means

##### Solution for Type SPF-2.4 Design

##### (i) Computational symbols

$$\sum_{i=1}^q \sum_{j=1}^N (ABS)^2 = [ABS]$$

$$\sum_{i=1}^N \frac{\left(\sum_{j=1}^q AS\right)^2}{q} = [AS]$$

$$\sum_{i=1}^p \frac{\left(\sum_{j=1}^q A\right)^2}{n_{ij}q} = [A]$$

$$\sum_{i=1}^p \sum_{j=1}^q \frac{(AB)^2}{n_{ij}} = [AB]$$

$$\tilde{n} = \frac{1}{(1/n_{ij} + 1/n_{ij} + \dots + 1/n_{ij})}$$

$$\sum_{i=1}^p \sum_{j=1}^q (\overline{AB})^2 = [AB]$$

$$\frac{\left( \sum_{i=1}^p \sum_{j=1}^q \overline{AB} \right)^2}{pq} = [\overline{X}]$$

$$\sum_{i=1}^p \frac{\left( \sum_{j=1}^q \overline{A} \right)^2}{q} = [A]$$

$$\sum_{j=1}^q \frac{\left( \sum_{i=1}^p \overline{B} \right)^2}{p} = [B]$$

(ii) Computational formulas

$$SS_A = \tilde{n}([\overline{A}] - [\overline{X}])$$

$$SS_{AB} = \tilde{n}([\overline{AB}] - [\overline{A}] - [\overline{B}] + [\overline{X}])$$

$$SS_{\text{subj w. groups}} = [AS] - [A]$$

$$SS_{B \times \text{subj w. groups}} = [ABS] - [AB] -$$

$$SS_B = \tilde{n}([\overline{B}] - [\overline{X}])$$

$$[AS] + [A]$$

(iii) Degrees of freedom

Source	df
1 A	$p - 1$
2 Subj. w. groups	$N - p$
3 B	$q - 1$
4 AB	$(p - 1)(q - 1)$
5 B x subj. w. groups	$(N - p)(q - 1)$

(iv) ANOV symbols

A = the two treatments used

$a_1$  = conventional instruction treatment

$a_2$  = learning package instruction treatment

B = the administration of the achievement examinations

$b_1$  = the unweighted mean achievement difference between post-test one and the pre-test

$b_2$  = the unweighted mean achievement difference between post-test two and the pre-test

$b_3$  = the unweighted mean achievement difference between post-test three and the pre-test

C = personnel

$c_1$  = pre-service personnel

$c_2$  = in-service personnel

## Subgroup Random Assignment

	Conventional Instruction	Learning Packages	Totals
Pre-service personnel	19	21	40
In-service personnel	<u>27</u>	<u>25</u>	<u>52</u>
Totals	46	46	92

Two of the in-service personnel from the conventionally instructed group did not return all of the post-tests, and consequently, were not included in the analysis.

## Null Hypothesis One

Null hypothesis 1

There is no significant difference in learning achievement from using the conventional instruction method ( $a_1$ ) or learning packages ( $a_2$ ) as measured by the post-tests (after statistically equating for pre-test differences, if necessary) when orienting teacher or teacher-trainees to the New Design.

In testing Null Hypothesis One, each of the unweighted mean difference sub-scores for the eight New Design components under investigation were analyzed by split-plot design analysis of variance. The same statistical treatment was also applied to the total scores. No significant differences between lecture-demonstration (conventional) ( $a_1$ ) and learning package

instruction ( $a_2$ ) were found (0.10 level), other than those which may have been caused by chance. See Tables 1.1 and 1.2. Both methods were equally effective in the initial instruction and for at least six weeks thereafter, as presented in Table 1.4.

Note should be taken that post-test scores were subtracted from the pre-test scores in each instance, as necessitated by the split-plot design, the statistical treatment used in this study. Higher scores on post-tests, therefore, resulted in negative "gain scores." A positive "gain score" is in reality the result of post-test scores being less than that of the pre-test.

Very highly significant differences (0.01) were found between the pre-test and subsequent administrations of the achievement test for most of the sub-scores. Similar findings were evidenced for totals as revealed in Tables 1.1, 1.2, and 1.4. Immediately after the workshop, the "gain scores" were substantial, but as time elapsed, the subjects apparently experienced some forgetting and the differences tended to be diminished but then increased. After six weeks, the conventionally-taught group ( $a_1$ ) showed a net gain which was very comparable to that of the group taught by learning package ( $a_2$ ). However, six months after the workshop, those who had received conventional instruction ( $a_1$ ) achieved a little higher than those who had used learning packages ( $a_2$ ).

According to Kirk (86), there is usually little interest in the main effects such as methods (A) and test administrations (B) if the interaction is significant in a split-plot design. "A significant interaction means that one treatment behaves differently under different levels of

the other treatment" (86, p. 263). No significant interaction was found on sub-scores, but very highly significant interaction (0.01) between methods (A) and test administrations (B) was found on totals. See Tables 1.1 and 1.3.

The tests for simple main effects in type SPF p.q. Design are formulated as follows:

Computational formulas for simple main-effects sum of squares

$$SS_A \text{ at } b_1 = \sum_{i=1}^p \frac{(AB_{i1})^2}{n} - \frac{\left( \sum_{i=1}^p B_{i1} \right)^2}{np}$$

$$SS_A \text{ at } b_2 = \sum_{i=1}^p \frac{(AB_{i2})^2}{n} - \frac{\left( \sum_{i=1}^p B_{i2} \right)^2}{np}$$

$$SS_A \text{ at } b_3 = \sum_{i=1}^p \frac{(AB_{i3})^2}{n} - \frac{\left( \sum_{i=1}^p B_{i3} \right)^2}{np}$$

As a computational check  $\sum_{j=1}^q SS_A \text{ for } b_j = SS_A + SS_{AB}$  .

$$SS_B \text{ at } a_1 = \sum_{j=1}^q \frac{(AB_{1j})^2}{n} - \frac{\left( \sum_{j=1}^q A_{1j} \right)^2}{nq}$$

$$SS_B \text{ at } a_2 = \sum_{j=1}^q \frac{(AB_{2j})^2}{n} - \frac{\left( \sum_{j=1}^q A_{2j} \right)^2}{nq}$$

As a computational check  $\sum_1^p SS_B$  for  $a_i = SS_B + SS_{AB}$ .

The error terms for the A, B, and AB effects are

$MS_{\text{subj w. groups}}$  for A

$MS_{B \times \text{subj w. groups}}$  for B

$MS_{B \times \text{subj w. groups}}$  for AB.

The rule governing the choice of error terms states that if the treatment and interaction which equal the sum of simple main effects have different error terms, as in the case of treatment A, the two error terms should be pooled in testing the simple main effects of A. Because A and AB have different error terms, the pooled error term for testing the simple main effects of A is

$$\begin{aligned} \text{Pooled error} &= \frac{SS_{\text{subj w. groups}} + SS_{B \times \text{subj w. groups}}}{(\text{df for } SS_{\text{subj w. groups}}) + (\text{df for } SS_{B \times \text{subj w. groups}})} \\ \text{(within cell error)} & \\ &= \frac{9.375 + 9.125}{6 + 18} = .771. \end{aligned}$$

(86, p. 264, 265)

Analysis of variance table for simple effects

<u>Source</u>	<u>df</u>
1. Between subjects	
2. Between A at $b_1$	$p - 1$
3. Between A at $b_2$	$p - 1$



<u>Source</u>	<u>df</u>
4. Between A at $b_3$	$p - 1$
5. Between A at $b_4$	$p - 1$
6. Within cell	$pq(n - 1)$
7. Within subjects	
8. Between B at $a_1$	$q - 1$
9. Between B at $a_2$	$q - 1$
10. AB	$(p - 1)(q - 1)$
11. B x subj w. groups	$p(n - 1)(q - 1)$
12. Total	$npq - 1$

Modification for Scheffé's ratio follows that for the t ratio (86, p. 266).

SS's for simple main effects take the following form:

$$SS_A \text{ for } b_1 = \bar{n} \left[ \sum_1^p (\overline{AB}_{i1})^2 - \frac{\left( \sum_1^p \overline{B}_{i1} \right)^2}{p} \right]$$

$$SS_B \text{ for } a_1 = \bar{n} \left[ \sum_1^q (\overline{AB}_{1j})^2 - \frac{\left( \sum_1^q \overline{A}_{1j} \right)^2}{q} \right]$$

(86, p. 277)

Since the AB interaction was very highly significant (0.01), simple main effects tests were performed as indicated in Table 1.4. No significant differences were found between the two methods (A) on the first and second post-test achievements. The interaction between methods (A) and

the administration of Post-Test Three ( $b_3$ ) was found to be significant (0.10). Since the unweighted mean achievement difference of the conventionally-instructed sample ( $a_1$ ) six months after the workshop was -0.095 as compared to -0.068 for the learning package taught group ( $a_2$ ) (Table 1.1), this investigation has found that the former group ( $a_1$ ) experienced a retention of cognitive learning over a period of six months which was greater at a significant level (0.10) than those instructed by learning packages (see Table 1.4). Six months after the workshop, those who had been taught conventionally ( $a_1$ ) increased their mean achievement score from 55.62 to 64.17, a gain of 8.55 points as compared with a mean score 57.51 to 63.63, a gain of only 6.12 for those instructed with learning packages ( $a_2$ ). See Table 1.5.

Null Hypothesis Number One, then, must be rejected.

Table 1.1. Conventional vs. learning package instruction--a comparison

All Personnel on Eight Concepts of New Design--Total		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{55.6739}{90} = 0.618$	$\frac{57.5870}{90} = 0.639$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.099	-0.113
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.060	-0.052
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.095	-0.068

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F <sup>††</sup>
Methods (A)	0.0035	1	0.0035	0.2874
Sub. w. gps.	1.0759	88	0.0122	
Test Admin. (B)	0.1131	2	0.0565	23.7800 <sup>**</sup>
AB	0.0188	2	0.0094	3.9571 <sup>**</sup>
B x Sub. w. gps.	0.4184	176	0.0024	

\*\*  
p 0.01

†† Tabled  $F_{1, 88}$  @ 0.10 = 2.77  
0.05 = 3.95  
0.01 = 6.93

††  $F_{2, 176}$  @ 0.10 = 2.30  
0.05 = 2.66  
0.01 = 3.89

(8, 59)

Table 1.2. Summary of findings

	Hypothesis One								
	Methods			Test Admin.			Interaction		
	0.10	0.05	0.01	0.10	0.05	0.01	0.10	0.05	0.01
1. Philosophy and Attitudes	0			#	*	**	0		
2. Behavioral Objectives	0			#			0		
3. Team Teaching	0			0			0		
4. Large Group Instruction	0			#	*	**	0		
5. Small Group Instruction	0			#	*	**	0		
6. Independent Study	0			#	*	**	0		
7. Auxiliary Personnel	0			#	*	**	0		
8. Learning Packages	0			#	*	**	0		
9. Total	0			#	*	**	#	*	**

0 = no significant difference.

# = significant difference =  $p < 0.10$ .

\* = highly significant difference =  $p < 0.05$ .

\*\* = very highly significant difference =  $p < 0.01$ .

Table 1.3. Interaction between methods (A) and test administrations (B)

All Participants On Eight New Design Concepts--Total

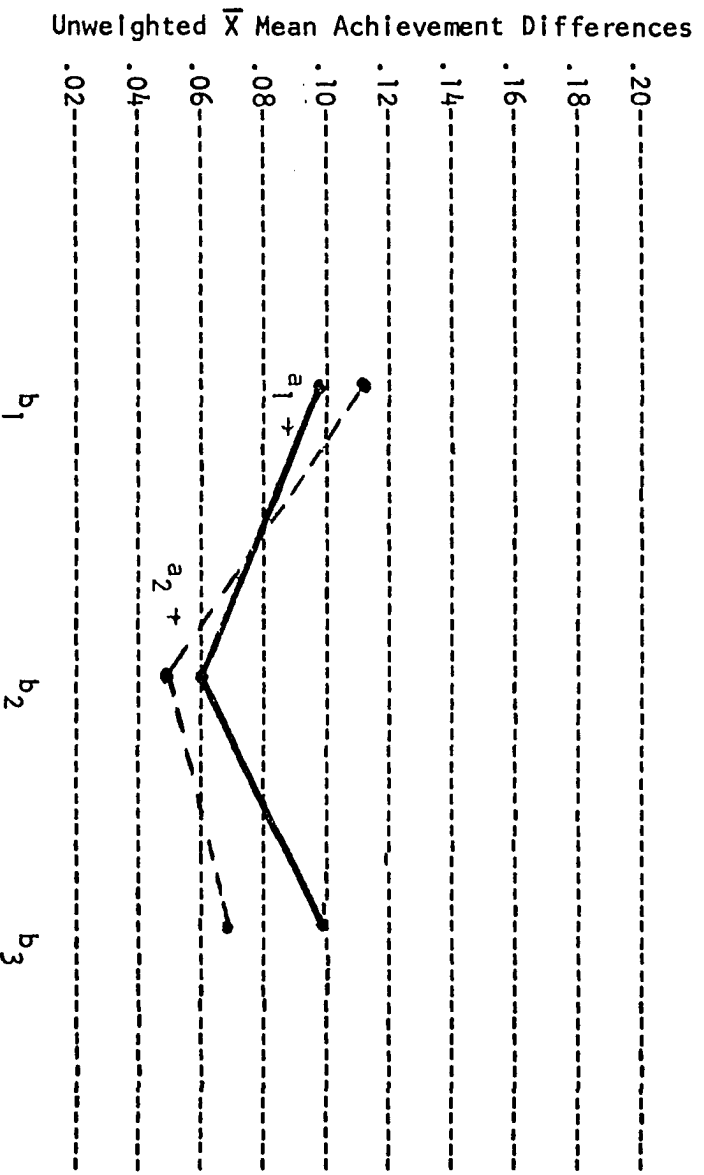
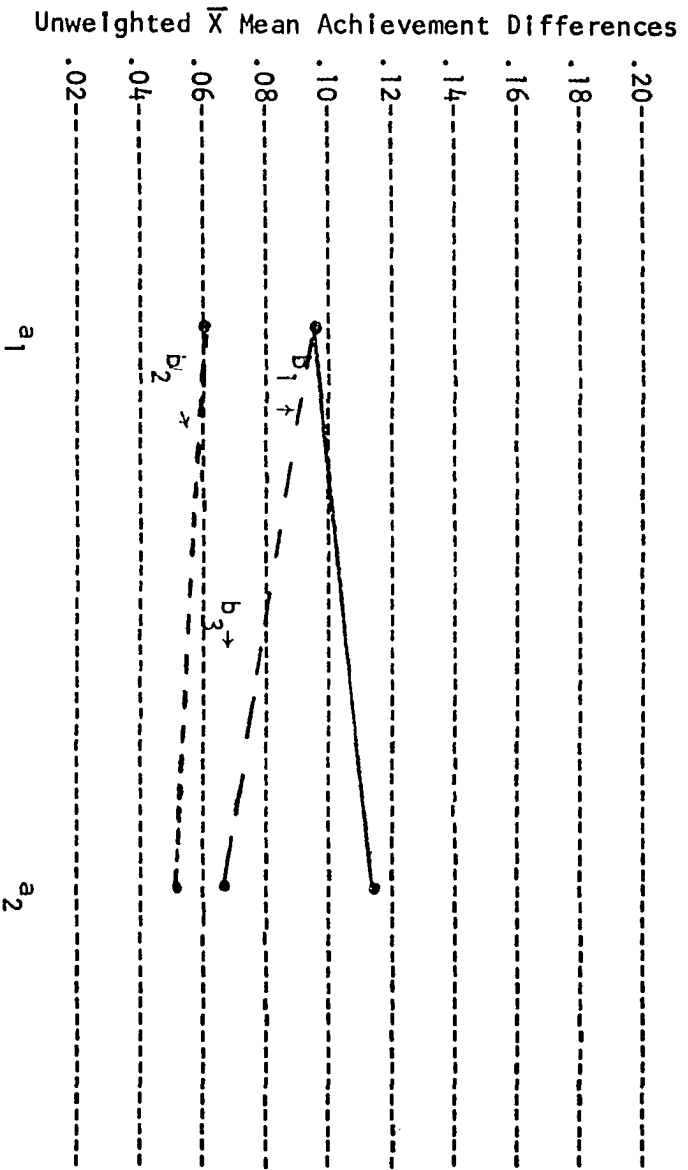


Table 1.4. Conventional vs. learning package instruction

Interaction Between Methods and Test Administrations--Total Analysis of Variance for Simple Effects				
Source	SS	df	MS	$F^{++}$
Between Subjects				
Between A at $b_1$	0.00576	1	0.00576	1.018
Between A at $b_2$	0.000144	1	0.000144	0.025
Between A at $b_3$	0.01802	1	0.01802	3.22 <sup>#</sup>
Within Cell	1.4942817	264	0.00566	
Within Subjects				
Between B at $a_1$	0.0417	2	0.0209	8.77 <sup>**</sup>
Between B at $a_2$	0.0549	2	0.02745	11.55 <sup>**</sup>
B x Subj. W. Groups	0.41838	176	0.002377	

<sup>#</sup>  $p < 0.10$ .

<sup>++</sup> Tabled  $F_{1, 264}$  @ 0.10 = 2.70  
 0.05 = 3.89  
 0.01 = 6.70

<sup>++</sup>  $F_{2, 176}$  @ 0.10 = 2.30  
 0.05 = 2.66  
 0.01 = 3.89

Table 1.5. Conventional vs. learning package instruction--a comparison

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Eight New Design Concepts--Total Unweighted <sup>†</sup> Means ( $\bar{X}$ ) Achievement		
	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Before Workshop	0.618	0.639
Immediately After Workshop	0.717	0.752
Six Weeks After Workshop	0.678	0.707
Six Months After Workshop	0.713	0.707

Equivalent Mean ( $\bar{X}$ ) Achievement Scores (Possible = 90)		
	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Before Workshop	55.620	57.510
Immediately After Workshop	64.530	67.680
Six Weeks After Workshop	61.020	62.190
Six Months After Workshop	64.170	63.630

---

## Null Hypothesis Two

Null Hypothesis 2

There is no significant difference in the persistence of cognitive learning, resulting from exposure to either of the two methods over a given period of time.

Hypothesis Two differs from Hypothesis One in that it was intended to examine the persistence of cognitive learning over a period of time. Interaction was discovered in Hypothesis One, and, this revealed that there was no significant difference between methods until the administration of Post-Test Three; at that time, those instructed conventionally ( $a_1$ ) scored higher at the 0.10 level. This finding rendered Hypothesis Two actually unnecessary. Stated another way, the test as to which method was better in Hypothesis One, determined which method persisted over time.

Very highly significant differences (0.01) among test administrations were found by using split-plot design analysis of variance for total scores and for six sub-scores. See Tables 1.1 and 1.4. The behavioral objectives sub-test revealed significant differences at the 0.10 level while the scores on team teaching showed no significant differences. No consistent sub-score pattern of gains and/or losses was indicated by these findings.

In order to determine which unweighted mean achievement differences were significant, the Scheffé S test was applied. Scheffé's Formula follows:

$$S = \sqrt{k-1 F_{\alpha, V_1, V_2}} \sqrt{MS \text{ error} \left[ \frac{\sum_{j=1}^k (C_j)^2}{n_j} \right]} \quad (86, \text{ p. } 91)$$



Again, no consistent pattern was evidenced among the sub-scores. In an application of Scheffé's S test to the total means, it was found that mean  $b_3$  was different from  $b_2$  and  $b_2$  from  $b_1$  at a very highly significant level (0.01) when testing conventional instruction. See Table 2.1.

The statistical treatment of learning package instruction ( $a_2$ ), revealed that  $b_1$  was different from  $b_2$  and  $b_3$  at a very highly significant level (0.01) as presented in Table 2.1. These findings tend to substantiate those of Null Hypothesis One.

Since there were no significant differences apparent between the methods immediately after the workshops, as measured by Post-Test One, nor six weeks after the workshop, as measured by Post-Test Two, but significant differences were evidenced by Post-Test Three scores, six months after the workshop, this experiment indicates that cognitive learning did persist over a period of time, (assuming neither group received additional instruction). See Table 1.4. Since both groups were randomly assigned, it was believed that any lack of representativeness which may have occurred, did so with both groups normally and randomly.

It has been found then, that cognitive learning did persist over a period of time (six months) and did so with significant differences on Post-Test Three in favor of conventional instruction ( $a_1$ ), as defined in this study. In light of these findings, Hypothesis Two must be rejected.

Table 2.1. Conventional vs. learning package instruction--a comparison

All Personnel on Eight New Design Concepts--Total			
Scheffé's Tests <sup>††</sup> of Unweighted Means Comparing $b_1$ with $b_2$ with $b_3$ at $a_1$			
	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.039**	
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$	0.004**	0.035**	
†† S.10 = 0.0223 <sup>#</sup>	S.05 = 0.0240*		S.01 = 0.0290**
Scheffé's Tests <sup>††</sup> of Unweighted Means Comparing $b_1$ with $b_2$ with $b_3$ at $a_2$			
	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.061**	0.045**
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$		0.016	
†† S.10 = 0.0218 <sup>#</sup>	S.05 = 0.0235*		S.01 = 0.0284**

## Null Hypothesis Three

Null hypothesis 3

There is no significant difference in the effectiveness of either method when evaluated in terms of each of the above-mentioned eight phases, with in-service personnel, as measured by the post-tests.

Each of the eight subscores, as well as the total score, was considered in measuring the grasp of New Design concepts by in-service personnel. The comparison was made between those in-service personnel who were taught conventionally ( $a_1$ ) and those taught by learning packages ( $a_2$ ).

In-service personnel were those classroom teachers and administrators of four midwestern Seventh-day Adventist secondary schools who participated in the workshops conducted on their respective campuses as part of this investigation.

No significant differences between methods of instruction were found, other than those which could be attributed to chance. Table 3.1 reveals that both methods were equally effective in teaching the eight New Design concepts to in-service personnel over an extended period of time. It is important, however, to note that at the time of the first post-test, which was given immediately after the workshop, those who had been instructed by learning packages ( $a_2$ ) scored an unweighted mean difference which was significantly higher (0.10) than that of the conventionally taught group ( $a_1$ ). See Table 3.4. The superiority, however, was not sustained.

Very highly significant differences (0.01) were found among un-weighted mean differences of the three post-tests. Immediately after the workshop the differences were the greatest, with the learning package group significantly higher (0.10). A decline was evidenced on Post-Test Two, but scores on Post-Test Three showed a gain. The difference was not significant.

Highly significant interaction was found between the methods and test administrations. At the time of the first post-test, the learning package group was significantly (0.10) superior. See Table 3.3. This is an interesting finding, especially since it occurred with in-service personnel and parallels the findings of Meeks and others (104, 129, 130). However, Null Hypothesis Three cannot be rejected on the basis of these findings.

Table 3.1. Conventional vs. learning package instruction--a comparison

In-Service Personnel on Eight New Design Concepts--Total Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{57.519}{90} = 0.639$	$\frac{59.160}{90} = 0.657$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.086	-0.125
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.038	-0.040
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.084	-0.072

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F <sup>††</sup>
Methods (A)	0.0037	1	0.0037	0.3155
Sub. w. gps.	0.5621	48	0.0117	
Test Admin. (B)	0.1121	2	0.0561	21.8299 <sup>**</sup>
AB	0.0170	2	0.0085	3.3111 <sup>*</sup>
B x Sub. w. gps.	0.2466	96	0.0026	

\*\*  
p < 0.01\*  
p < 0.05

††

††

Tabled F<sub>1, 48</sub> @ 0.10 = 2.82  
0.05 = 4.04  
0.01 = 7.19

F<sub>2, 96</sub> @ 0.10 = 2.37  
0.05 = 3.10  
0.01 = 4.83

Table 3.2. Summary of findings

		Hypothesis Three								
		Methods			Test Admin.			Interaction		
		0.10	0.05	0.01	0.10	0.05	0.01	0.10	0.05	0.01
1.	Philosophy and Attitudes	0			#	*	**	0		
2.	Behavioral Objectives	0			0			0		
3.	Team Teaching	0			0			0		
4.	Large Group Instruction	0			#	*	**	0		
5.	Small Group Instruction	0			#	*		0		
6.	Independent Study	0			#	*	**	0		
7.	Auxiliary Personnel	0			#			0		
8.	Learning Packages	0			#	*	**	0		
9.	Total	0			#	*	**	#	*	

0 = no significant difference.

# = significant difference =  $p < 0.10$ .

\* = highly significant difference =  $p < 0.05$ .

\*\* = very highly significant differences =  $p < 0.01$ .

Table 3.3. Interaction between methods (A) and test administrations (B)

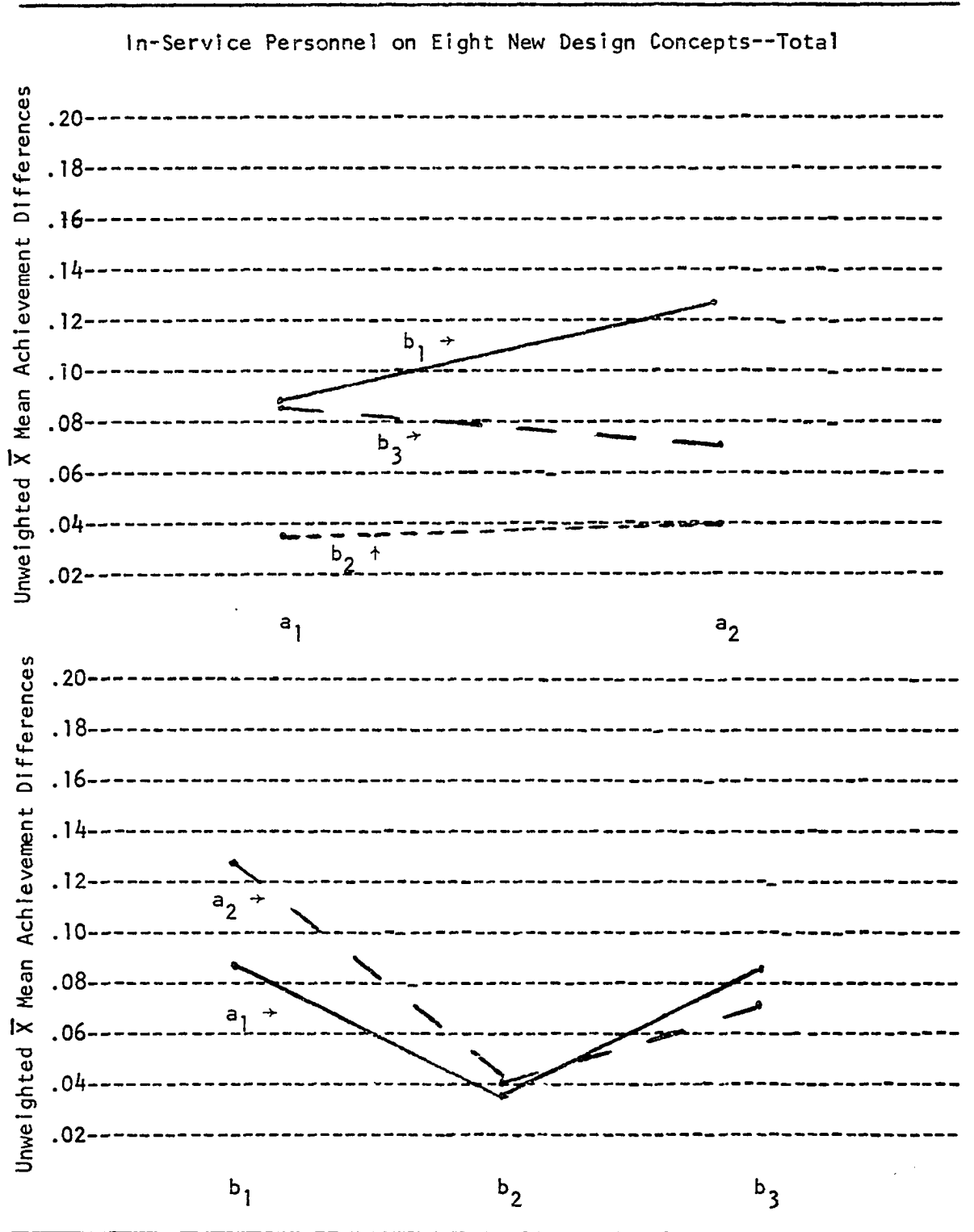


Table 3.4. Conventional vs. learning package instruction

Interaction Between Methods and Test Administrations--Total				
Analysis of Variance for Simple Effects				
Source	SS	df	MS	F <sup>††</sup>
Between Subjects				
Between A at b <sub>1</sub>	0.019	1	0.019	3.38 <sup>#</sup>
Between A at b <sub>2</sub>	0.00005	1	0.00005	1.0
Between A at b <sub>3</sub>	0.0018	1	0.0018	1.0
Within Cell	0.8087	144	0.00562	
Within Subjects				
Between B at a <sub>1</sub>	0.03687	2	0.018435	7.7 <sup>**</sup>
Between B at a <sub>2</sub>	0.09215	2	0.0461	17.94 <sup>**</sup>
B x Subj. w. groups	0.2466	96	0.00257	

<sup>#</sup>p < 0.10.

<sup>††</sup>Tabled F<sub>1, 144</sub> @ 0.10 = 2.75  
 0.05 = 3.92  
 0.01 = 6.84

<sup>††</sup>F<sub>2, 96</sub> @ 0.10 = 2.37  
 0.05 = 3.10  
 0.01 = 4.83

(8, 59)



Table 3.5. Conventional vs. learning package instruction--a comparison

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In-Service Personnel On Eight New Design Concepts--Total  
Unweighted Means ( $\bar{X}$ ) Achievement

	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Before Workshop	0.639	0.657
Immediately After Workshop	0.725	0.782
Six Weeks After Workshop	0.677	0.697
Six Months After Workshop	0.723	0.729

Equivalent Mean ( $\bar{X}$ ) Achievement Scores  
(Possible = 90)

	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Before Workshop	57.519	59.160
Immediately After Workshop	65.250	70.380
Six Weeks After Workshop	60.930	62.730
Six Months After Workshop	65.070	65.610

---

Table 3.6. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Eight New Design Concepts--Total			
Scheffé's Tests <sup>††</sup> of Unweighted Means Comparing $b_1$ with $b_2$ with $b_3$ at $a_1$			
	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.048 <sup>**</sup>	
Six Weeks After Workshop = $b_2$			0.002
Six Months After Workshop = $b_3$		0.046 <sup>**</sup>	
<sup>††</sup> S.10 = 0.0312 <sup>#</sup>	S.05 = 0.0356 <sup>*</sup>	S.01 = 0.0445 <sup>**</sup>	
Scheffé's Tests <sup>††</sup> of Unweighted Means Comparing $b_1$ with $b_2$ with $b_3$ at $a_2$			
	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.085 <sup>**</sup>	0.053 <sup>**</sup>
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$		0.032 <sup>**</sup>	
<sup>††</sup> S.100 = 0.0312 <sup>#</sup>	S.05 = 0.0356 <sup>*</sup>	S.01 = 0.445 <sup>**</sup>	

## Null Hypothesis Four

Null hypothesis 4

There is no significant difference in the effectiveness of either method with pre-service personnel in any of the eight phases.

No significant differences between methods of instruction were found when measuring the achievement of pre-service personnel in learning eight New Design concepts either in sub-scores or totals. Pre-service personnel were those junior and senior students at Union College who were enrolled in secondary teacher education. Both methods, conventional ( $a_1$ ) and learning package instruction ( $a_2$ ) were found to be equally effective.

Highly significant differences (0.05) were found among test administrations. When Scheffé's S test was applied to the means, it was found that a highly significant loss had occurred between the administration of Post-Test One and Post-Test Two. That is, the grand mean for pre-service personnel of both groups on Post-Test Two (six weeks after the workshop) showed a highly significant (0.05) loss over that of Post-Test One. See Tables 4.1 and 4.3. The grand mean on Post-Test Three was slightly higher than that of Post-Test Two but not significantly. It should be noted, however, that this slight gain resulted from an unweighted mean difference of -0.110 for those who had received conventional instruction ( $a_1$ ) as compared with -0.062 for those who had received learning package instruction ( $a_2$ ). This is the equivalent to an average growth of 9.86 for the conventional ( $a_1$ ) group as compared to 5.55 for the learning package participants ( $a_2$ ). See Table 4.4. No significant interaction between methods and test administration was found. The analysis of variance statistic was not sufficiently large enough to allow rejection of Null Hypothesis Four.

Table 4.1. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Eight New Design Concepts--Total Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{53.053}{90} = 0.589$	$\frac{56.190}{90} = 0.624$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.116	-0.097
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.088	-0.066
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.110	-0.062

## Analysis of Variance for Unweighted Means

Source	S	df	MS	F <sup>††</sup>
Methods (A)	0.0261	1	0.0261	2.0952
Sub. w. gps.	0.4732	38	0.0125	
Test Admin. (B)	0.0187	2	0.0094	4.6967*
AB	0.0052	2	0.0026	1.3038
B x Sub. w. gps.	0.1514	76	0.0020	

\*  $p < 0.05$ 

††

Tabled  $F_{1, 38}$  @ 0.10 = 2.85  
 0.05 = 4.10  
 0.01 = 7.35

††

$F_{2, 76}$  @ 0.10 = 2.37  
 0.05 = 3.12  
 0.01 = 4.89

(8, 59)

Table 4.2. Summary of findings

	Hypothesis Four			
	Methods	Test Admin.		Interaction
1. Philosophy and Attitudes	0	0		0
2. Behavioral Objectives	0	0		0
3. Team Teaching	0	#	*	0
4. Large Group Instruction	0	#	* **	0
5. Small Group Instruction	0	#	* **	0
6. Independent Study	0	#	* **	0
7. Auxiliary Personnel	0	#	* **	0
8. Learning Packages	0	#	* **	0
9. Total	0	#	*	0

0 = no significant difference.

# = significant difference =  $p < 0.10$ .

\* = highly significant difference =  $p < 0.05$ .

\*\* = very highly significant difference =  $p < 0.01$ .

Table 4.3. Conventional vs. learning package instruction--a comparison

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Pre-Service Personnel On Eight New Design Concepts--Total

Scheffé's Tests<sup>††</sup> of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at A

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.030 <sup>*</sup>	0.0210
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$		0.009	

---

††  $s_{.10} = 0.0217^{\#}$                        $s_{.05} = 0.0249^*$                        $s_{.01} = 0.312^{**}$

(8, 59)

Table 4.4. Conventional vs. learning package instruction--a comparison

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Pre-Service Personnel on Eight New Design Concepts--Total  
Unweighted\* Mean ( $\bar{X}$ ) Achievement

	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Before Workshop	0.589	0.624
Immediately After Workshop	0.705	0.721
Six Weeks After Workshop	0.677	0.690
Six Months After Workshop	0.699	0.686

Equivalent Mean ( $\bar{X}$ ) Achievement Scores  
(Possible = 90)

	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Before Workshop	53.053	56.190
Immediately After Workshop	63.450	64.890
Six Weeks After Workshop	60.930	62.100
Six Months After Workshop	62.910	61.740

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## Null Hypothesis Five

Null Hypothesis 5

There is no significant difference in the resulting teacher-behavior change over a period of time between the methods as measured by self-reported questionnaires.

Each experienced teacher in the study was questioned as to his use of and satisfaction with the New Design concepts under investigation. An analysis of the returns has been included below which indicates that only thirty-six of the possible fifty-two had classroom assignments throughout the two-year period. Some teachers had entered administrative work, continued graduate study or for other reasons their responses were not appropriate to the study.

In-Service Personnel Responses to Ex-Post Facto Questionnaires  
(Educational Practices Fall, 1970 and  
Use of New Design Concepts Spring, 1972)

	Conventional (a <sub>1</sub> )	Learning Package (a <sub>2</sub> )
Usable Responses	12	18
Non-Usable Responses		
Administrators (were or become)	5	2
Advanced Schooling	3	1
Incomplete	1	1
Music Teachers	4	3
Other Employment	2	0
	27	25

Ten characteristics (See Appendix B) were used in the questionnaires to determine the teacher's "favorite class" taught. The "favorite class"



was chosen because, it was believed, that teacher would put forth his best efforts, employ his most creative ideas, and use the New Design strategies which he considered most effective in the class rated "favorite" by him. His combined use or nonuse of and degree of satisfaction or dissatisfaction with the recommended strategies was used to test Null Hypothesis Five and to determine his philosophy of and attitude toward New Design concepts.

Each form of the instruments was pilot tested with ten teachers at College View Academy in Lincoln, Nebraska and then refined in accordance with their responses and suggestions. Both questionnaires were designed to elicit the same kind of information but have a somewhat different wording, order of questioning, and appearance.

### Practices

Large group instruction, small group instruction, and independent study The way in which instructional time was used received a prime interest priority. Teachers were asked to state the fraction or percentage of total time spent by the average student (for the class which had just been rated as "favorite") in large group instruction, small group instruction and/or independent study in the spring of 1972; the responses were compared with their stated practices in the fall of 1970. The conventionally instructed group ( $a_1$ ) showed a slight mean increase in the use of large group instructional time after the treatment (35.5 to 38.7 percent) and used the small group strategy an average of two-and-one-half times more than before (9.5 to 25.7 percent). The use of independent

study time dropped from 55.4 percent to 35.6 percent. See Figure 5.1.

The group instructed by learning packages ( $a_2$ ) also showed an increase in the use of large group instruction (34.2 to 40.8 percent), and multiplied their use of small group time an average of nearly four times (6.4 to 24.5 percent). Independent study time dropped from an average of 59.4 percent to 34.7 percent as portrayed in Figure 5.1.

#### Behavioral objectives, team teaching, and learning packages

Questions were posed to elicit the percentage or fraction of total concepts taught in the "favorite" class which had been taught by the use of behavioral objectives, team teaching and/or learning packages. The conventional group ( $a_2$ ) reduced their use of behavioral objectives from 52 percent of their concepts taught with this technique to 45 percent. The learning package group ( $a_2$ ) decreased theirs from 76 percent to 35 percent. See Figure 5.2.

Team teaching of concepts also decreased after the workshop. The teachers who were taught conventionally ( $a_1$ ) used a team approach for three percent of the concepts taught in their "favorite class" before the workshop as compared to no use of the technique after. The group taught by learning packages ( $a_2$ ) used the strategy a bit more; 10 percent of their concepts team taught before the treatment with two percent after as portrayed in Figure 5.2.

The use of learning packages experienced a fate similar to that of behavioral objectives and team teaching. The conventionally taught teachers ( $a_1$ ) reduced their percentage of concepts taught by learning packages from 17 percent to 10 percent. Those taught by learning

packages ( $a_2$ ) decreased from 34 to 10 that percentage of concepts taught by learning packages; this is revealed in Figure 5.2.

### Pre- and Post-Tests

The teachers were asked, "For what percentage or fraction of instructional units (as you define them) did or will you use pre-tests?" A similar question was asked concerning post-tests. The teachers still believed more strongly in post-tests than pre-tests, even after the treatment. The group who received conventional instruction ( $a_1$ ), reduced their use of pre-tests from an average of nine percent to eight percent of the units taught in their "favorite classes" and their use of post-tests from 78 percent to 73 percent. See Figure 5.1.

The learning-package-taught-group ( $a_2$ ) used pre-tests for four percent of the units taught in their "favorite class" before treatment, but increased to 10 percent after. The use of post-tests was reduced from an average of 68 percent of units taught to 59 percent.

### Auxiliary personnel

To determine the employment of aides and community resource people, the teachers were simply asked for the number of such persons, from various categories, who had been used in the designated class during the period under consideration. The use of community resource persons in the classroom was not a very popular practice before the workshops and apparently even less popular after. Those conventionally instructed ( $a_1$ ) used only an average of 1.7 community resource people per teacher per semester before, but only .75 persons after the treatment. The learning

package instructed group ( $a_2$ ) used some more, an average of 1.9 persons per teacher per semester before the workshop as compared with 1.5 after.

Aides used were limited to paid students. Each teacher in the group taught conventionally ( $a_1$ ) employed an aide for an average of 126 minutes per week before the treatment and 334 minutes per week after. The group taught by learning packages ( $a_2$ ) received assistance from student aides for an average of 396 minutes per week before the workshop and 290 minutes per week after as presented in Figure 5.4.

### Satisfactions

A Likert-type scale was used to determine the degree of satisfaction or dissatisfaction which each teacher had with the New Design strategies. The scale ranged from zero which meant 'most dissatisfaction' to five which was equated with 'most satisfaction'; two and five-tenths was set as neutral.

The pooled 't' model which follows was used for those comparisons in which the variances were homogeneous. See Tables 5.1, 5.2, 5.3, 5.4 and 5.6.

$$t = \frac{\bar{D}_1 - \bar{D}_2}{\sqrt{\frac{[\sum D_1^2 - \frac{(\sum D_1)^2}{n_1}] + [\sum D_2^2 - \frac{(\sum D_2)^2}{n_2}]}{n_1 + n_2 - 2} \left( \frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

Degrees of Freedom =  $n_1 + n_2 - 2$ .

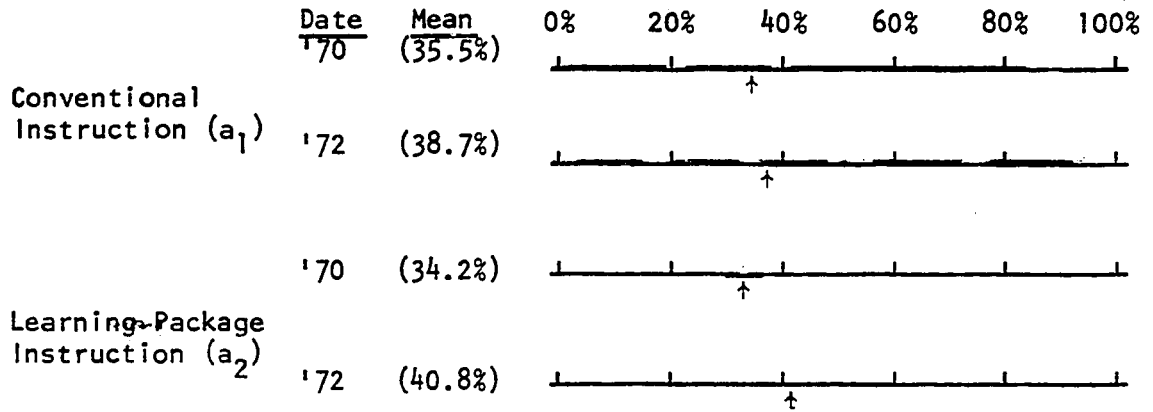
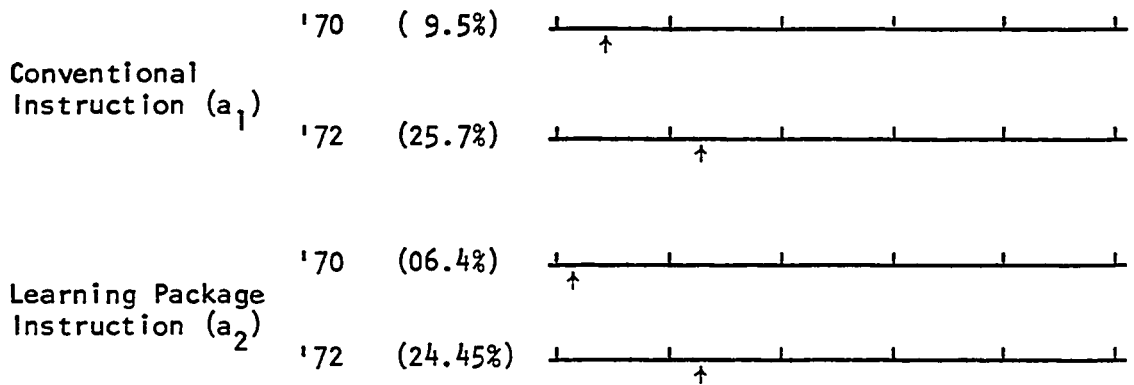
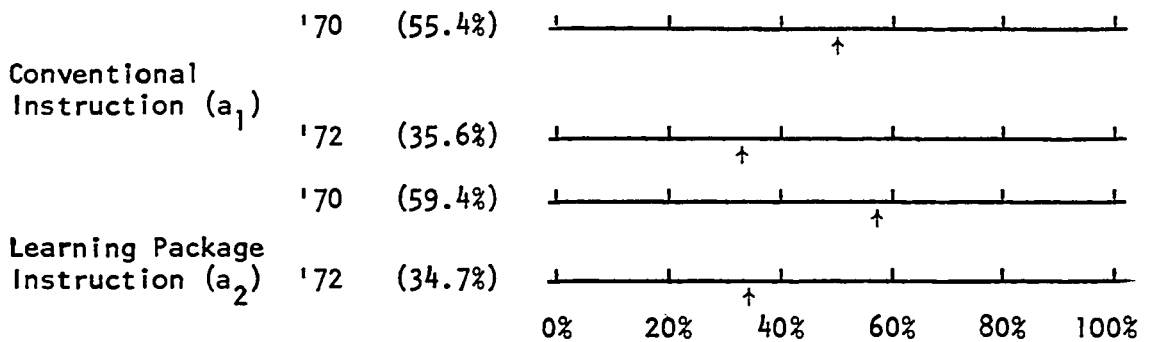
Mean Uses of Instructional TimeLarge Group InstructionSmall Group InstructionIndependent Study

Figure 5.1. Instructional time use comparison

Mean Percentage of Concepts Taught by  
Behavioral Objectives, Team Teaching, and Learning Packages

Behavioral Objectives

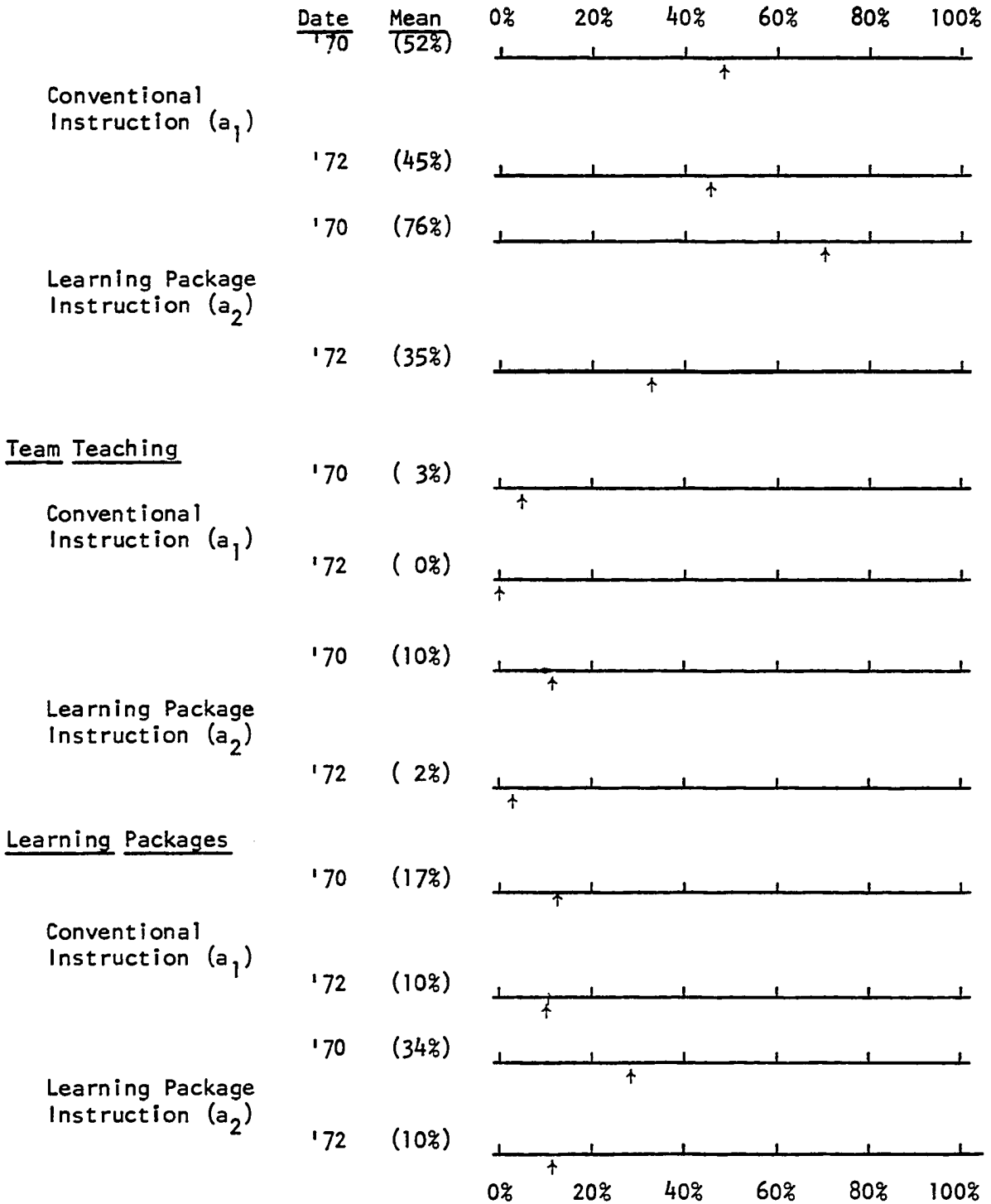
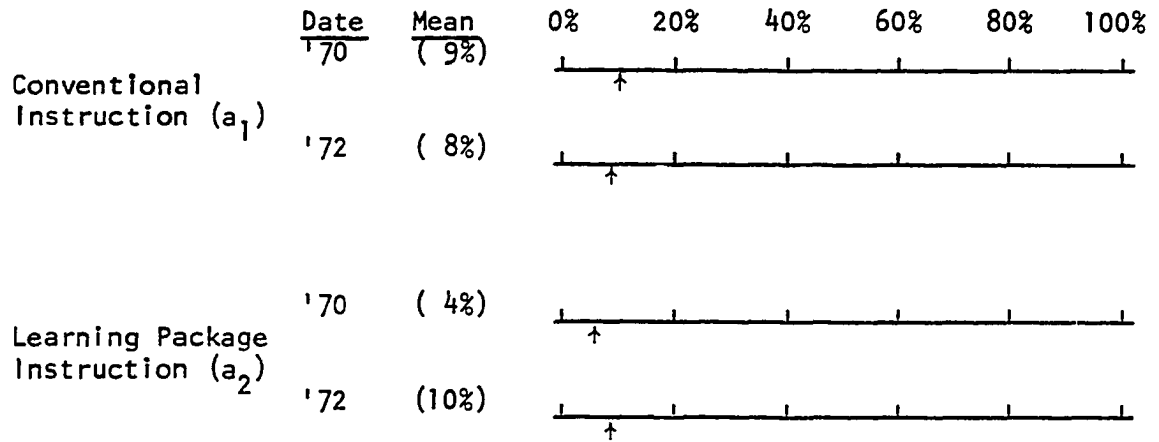


Figure 5.2. Conventional vs. learning package instruction--a comparison

Percentage of Units Pre-Tested and Post-Tested

Pre-Tested Units



Post-Tested Unit

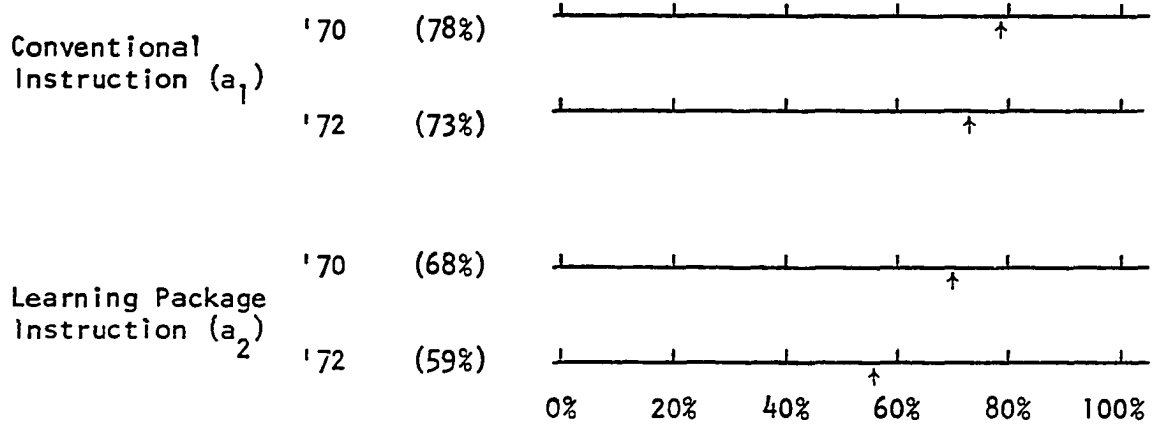
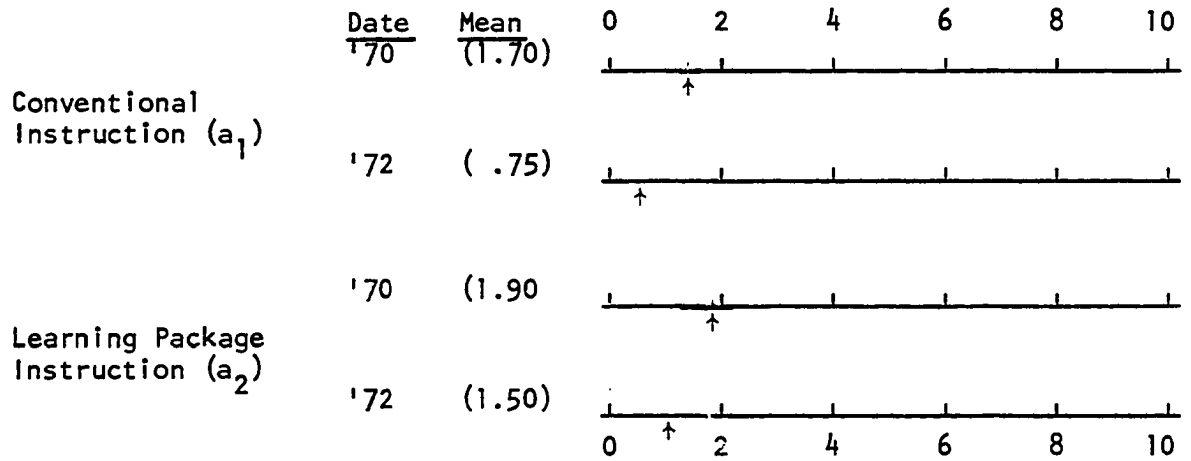


Figure 5.3. Conventional vs. learning package instructions--  
a comparison

Auxiliary Personnel Employed - Means

Community Resource Persons Used Per Teacher Per Semester



Percentage of Teachers Who Had Student Aides

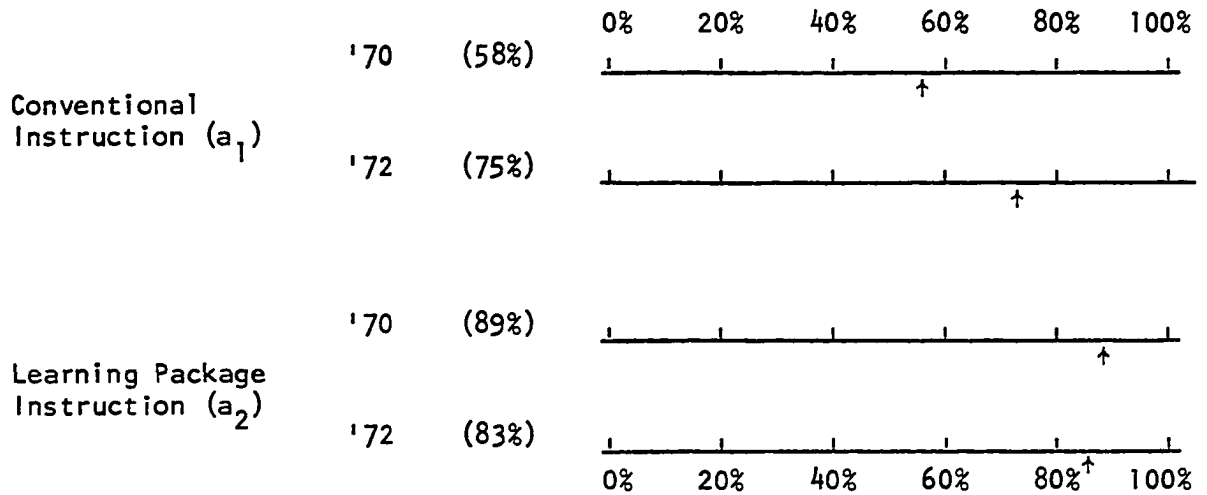


Figure 5.4. Conventional vs. learning package instruction--  
a comparison



Minutes Per Week Per Teacher of Student Aide

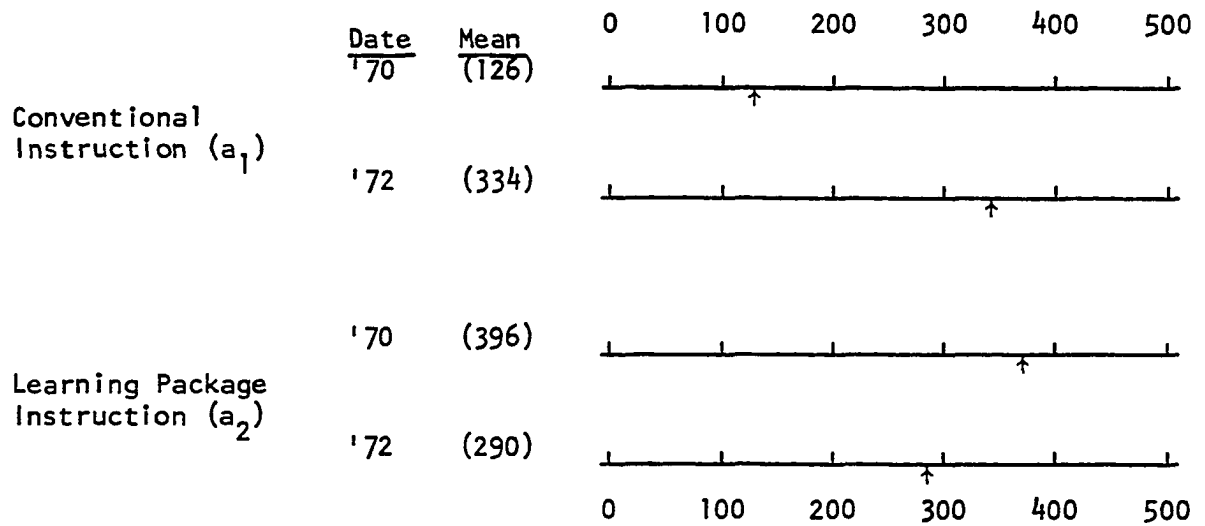
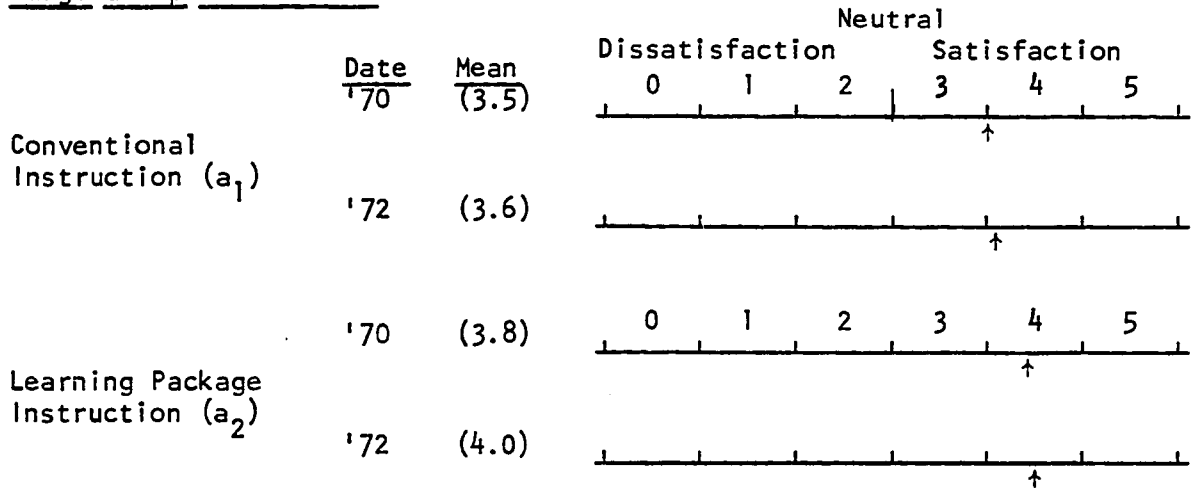


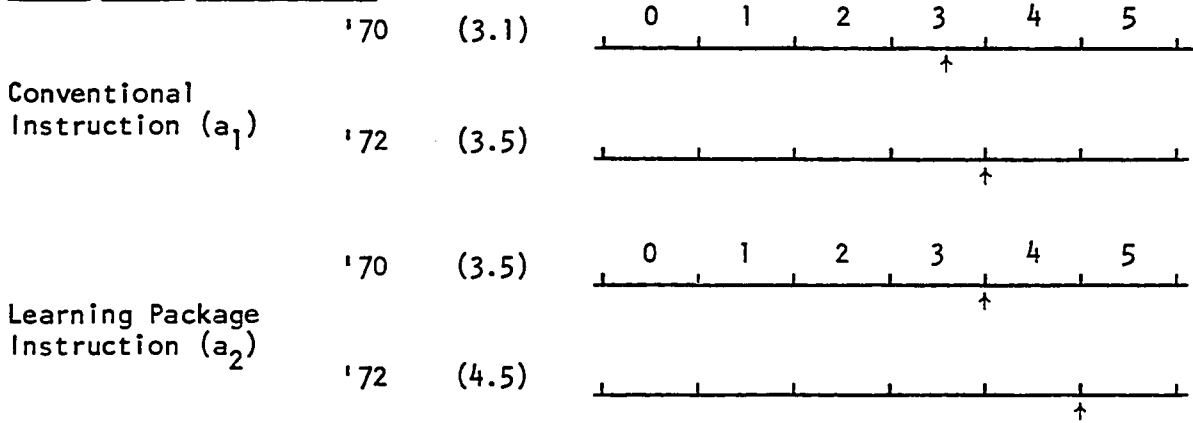
Figure 5.4. (Continued)

In-Service-Mean Satisfaction With New Design Techniques--Summary

Large Group Instruction



Small Group Instruction



Independent Study

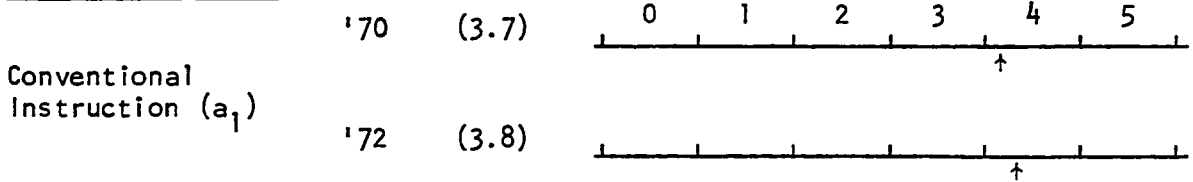


Figure 5.5. Conventional vs. learning package instruction--a comparison

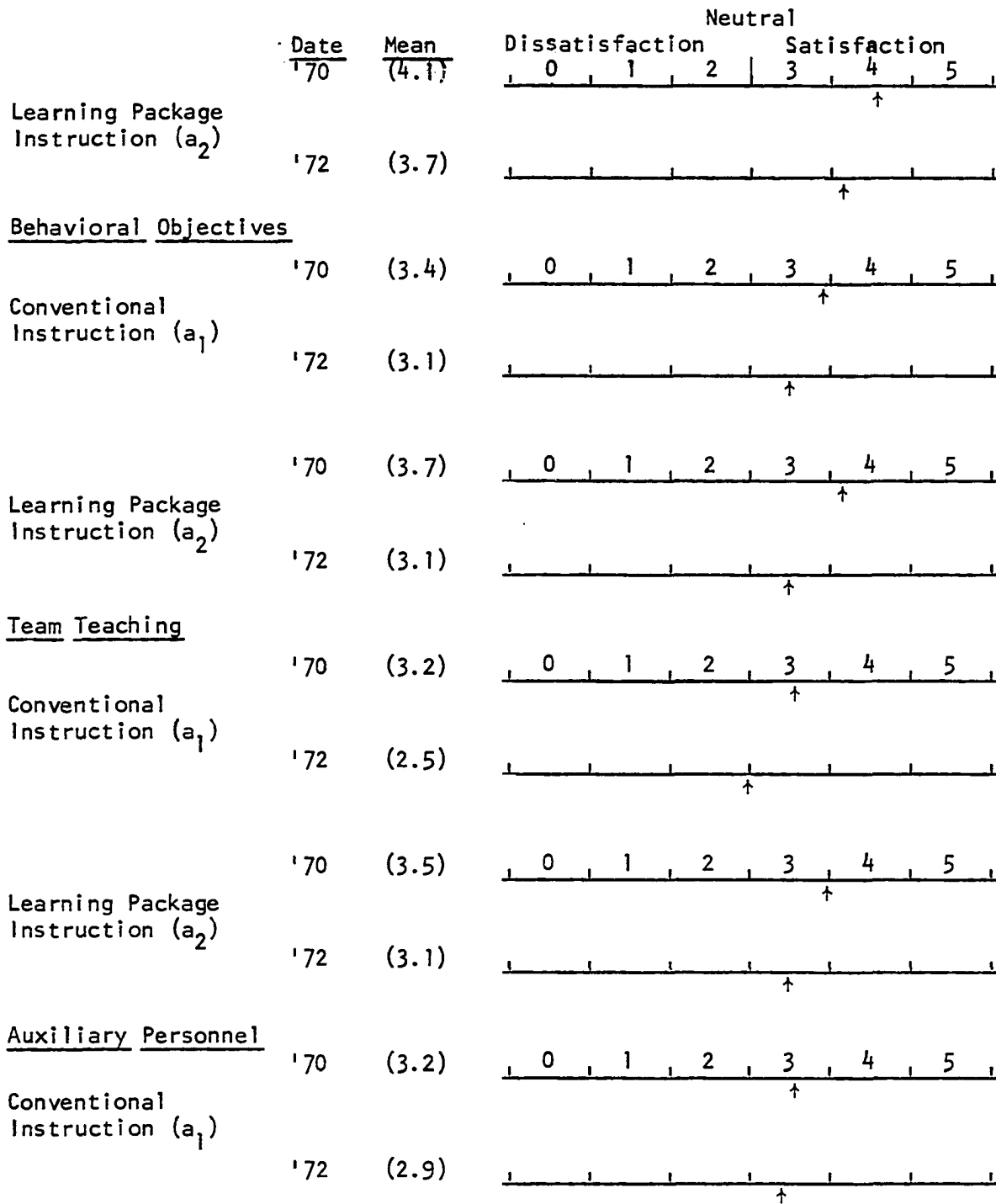


Figure 5.5. (Continued)

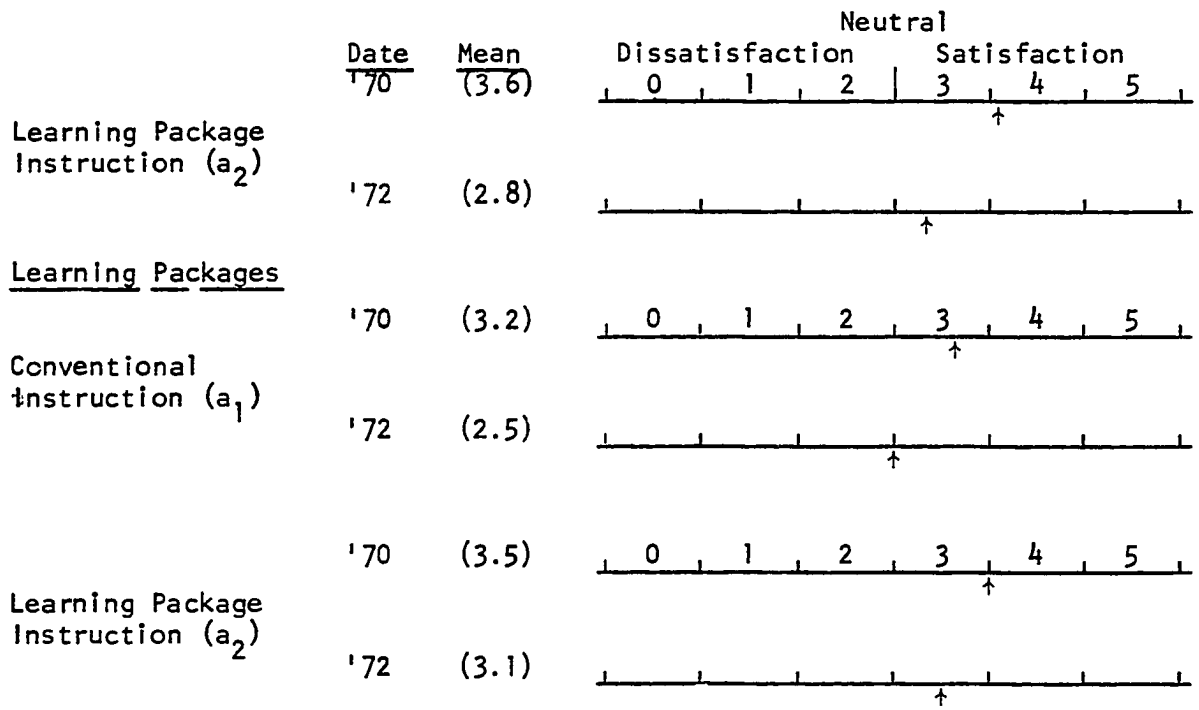


Figure 5.5. (Continued)

The following separate "t" model was used (175) for the comparisons between heterogeneous variances.

$$t = \frac{\bar{D}_1 - \bar{D}_2}{\sqrt{\frac{\Sigma D_1^2 - \frac{(\Sigma D_1)^2}{n_1} + \Sigma D_2^2 - \frac{(\Sigma D_2)^2}{n_2}}{n_1(n_1 - 1) + n_2(n_2 - 1)}}$$

Degrees of Freedom = the average of the "t" values for (a) the degrees of freedom equal to  $n_1 - 1$  and (b) degrees of freedom equal to  $n_2 - 1$  (175). See Tables 5.5 and 5.7.

No significant differences were found between the two methods in the change in teacher satisfaction with New Design strategies which occurred between the fall of 1970 and the spring of 1972 as revealed in Tables 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7. This was true of both total and sub-comparisons.

Both methods, conventional instruction ( $a_1$ ) and learning package instruction ( $a_2$ ) were equally ineffective in improving teacher satisfaction or practice with the exception of small group instruction. See Figures 5.5 and 5.6.

Large group instruction Satisfaction with large group instruction, as a technique, was rated, expost facto, by the conventionally instructed group at a mean of 3.5 in the fall of 1970 and at a mean of 3.58 in the spring of 1972 after the workshop. The learning package instructed group ( $a_2$ ) rated the same technique at a mean of 3.78 in 1970 and 4.0 in 1972. See Figure 5.5.

Small group instruction Conventionally taught teachers ( $a_1$ ) moved toward "more satisfaction" with small group instruction; their mean response ranged from 3.08 to 3.50. Teachers who were instructed by learning packages ( $a_2$ ) rated this technique between "more satisfaction" and "most satisfaction," as indicated on Figure 5.5. The average rating was 3.53 in 1970 and 4.53 in 1972.

Independent study Like the other two components of time utilization discussed previously, independent study was rated more positively in 1972 than 1970 by the conventionally taught groups ( $a_1$ ). Figure 5.5 reveals a mean of 3.67 in 1970 and 3.79 in 1972. Learning package instructees ( $a_2$ ) found independent study less satisfying in 1972. The mean declined from 4.14 to 3.69.

Behavioral objectives, team teaching, auxiliary personnel, and learning packages Both groups found behavioral objectives, team teaching, auxiliary personnel and learning package techniques less satisfying in 1972 than previously. Conventionally instructed teachers began with means of 3.38, 3.21, 3.21, and 3.21, respectively, and declined to 3.13, 2.54, 2.88, and 2.54. Learning package instructed teachers rated behavioral objectives, team teaching, auxiliary personnel, and learning package concepts in 1970 at 3.72, 3.50, 3.61, and 3.50, in that order, but decreased to 3.14, 3.11, 2.78, and 3.11 at the close of the investigative period. See Figure 5.6.

Hypothesis five: summary findings Both groups increased the use of large and small group instruction and found more satisfaction with those techniques. The other strategies were generally used less and

rated as giving less satisfaction except one. The use of student aides was increased by the teachers who were taught conventionally ( $a_1$ ) but decreased by the others ( $a_2$ ). The findings related to educational practice were limited to descriptive statistics. For this reason, many of the differences presented may have been due to chance variation. No significant differences were found statistically between the two methods in altering the "satisfaction" response. On the basis of these findings, Hypothesis Five cannot be rejected.

Table 5.1. An analysis of teacher satisfaction

	Large Group Instruction	
	<u>Conventional Instruction (a<sub>1</sub>)</u>	<u>Learning Package Instruction (a<sub>2</sub>)</u>
n	12	18
$\bar{D}$	0.0833	0.2222
$\Sigma D^2$	9	25.5
$(\Sigma D)^2/n$	0.0833	0.8888
d. f.	11	17

Ho:  $\mu_1 = \mu_2$ 

Test Used: Pooled "t"

Tabled t.10 = 1.70<sup>#</sup>t.05 = 2.05<sup>\*</sup>t.01 = 2.76<sup>\*\*</sup>

Calculated t = -0.3407

No significant difference

(8)



Table 5.2. An analysis of teacher satisfaction

	Small Group Instruction	
	<u>Conventional Instruction (a<sub>1</sub>)</u>	<u>Learning Package Instruction (a<sub>2</sub>)</u>
n	12	18
$\bar{D}$	0.4167	1.0000
$\Sigma D^2$	42.5	64.5
$(\Sigma D)^2/n$	2.0833	18.0
df	11	17

Ho:  $\mu_1 = \mu_2$

Test Used: Pooled "t"

Tabled t.10 = 1.70<sup>#</sup>

t.05 = 2.05<sup>\*</sup>

t.01 = 2.76<sup>\*\*</sup>

Calculated t = -0.8499

No significant difference

(8)

Table 5.3. An analysis of teacher satisfaction

	Independent Study	
	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
n	12	18
$\bar{D}$	0.1250	-0.4444
$\Sigma D^2$	23.25	24.00
$(\Sigma D)^2/n$	0.1875	3.5555
df	11	17

Ho:  $\mu_1 = \mu_2$

Test Used: Pooled "t"

Tabled  $t_{.10} = 1.70^\#$

$t_{.05} = 2.05^*$

$t_{.01} = 2.76^{**}$

Calculated  $t = 1.226$

No significant difference

(8)

Table 5.4. An analysis of teacher satisfaction

	Team Teaching	
	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
n	12	18
$\bar{D}$	0.1250	0.5555
$\Sigma D^2$	5.25	16.50
$(\Sigma D)^2/n$	0.1875	5.5555
df	11	17

Ho:  $\mu_1 = \mu_2$

Test used: pooled "t"

Tabled  $t_{.10} = 1.70^{\#}$

$t_{.05} = 2.05^*$

$t_{.01} = 2.76^{**}$

Calculated  $t = 1.5287$

No significant difference

(8)

Table 5.5. An analysis of teacher satisfaction

	Behavioral Objectives	
	<u>Conventional Instruction (a<sub>1</sub>)</u>	<u>Learning Package Instruction (a<sub>2</sub>)</u>
n	12	18
$\bar{D}$	-0.25	-0.8055
$\Sigma D^2$	18.5	24.25
$(\Sigma D)^2/n$	0.75	11.6805
df	11	17

Ho:  $\mu_1 = \mu_2$

Test used: Separate "t"

Tabled t.10 = 1.77<sup>#</sup>

t.05 = 2.16<sup>\*</sup>

t.01 = 3.01<sup>\*\*</sup>

Calculated t = 1.3264

No significant difference

(8)

Table 5.6. An analysis of teacher satisfaction

	Auxiliary Personnel	
	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
n	12	18
$\bar{D}$	-0.5833	-0.8333
$\Sigma D^2$	20.0	42.0
$(\Sigma D)^2/n$	4.2777	12.5
df	11	17

$H_0: \mu_1 = \mu_2$

Test used: pooled "t"

Tabled  $t_{.10} = 1.70^{\#}$

$t_{.05} = 2.05^*$

$t_{.01} = 2.76^{**}$

Calculated  $t = 0.3734$

No significant difference

(8)

Table 5.7. An analysis of teacher satisfaction

	Learning Package	
	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
n	12	18
$\bar{D}$	-0.3333	-0.3888
$\Sigma D^2$	9	34
$(\Sigma D)^2/n$	1.3333	2.7222
df	11	17

$H_0: \mu_1 = \mu_2$

Test used: separate "t"

Tabled  $t_{.10} = 1.77^\#$

$t_{.05} = 2.16^*$

$t_{.01} = 3.01^{**}$

Calculated  $t = 0.1386$

No significant difference

(8)

Table 5.8b. Variance of teacher satisfaction--calculated

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	<u>Conventional Instruction (<math>a_1</math>)</u>	<u>Learning Package Instruction (<math>a_2</math>)</u>
Large Group Instruction	$s^2 = \frac{9 - 0.0833}{11} = 0.8106$	$s^2 = \frac{25.5 - 0.8888}{17} = 1.4477$
Small Group Instruction	$s^2 = \frac{42.5 - 2.0833}{11} = 3.674$	$s^2 = \frac{64.5 - 18.0}{17} = 2.735$
Independent Study	$s^2 = \frac{23.25 - 0.1875}{11} = 2.0966$	$s^2 = \frac{24.0 - 3.5555}{17} = 1.2026$
Team Teaching	$s^2 = \frac{5.25 - 0.1875}{11} = 0.4602$	$s^2 = \frac{16.5 - 5.5555}{17} = 0.6438$
Behavioral Objectives	$s^2 = \frac{18.5 - 0.75}{11} = 1.614$	$s^2 = \frac{24.25 - 11.6805}{17} = 0.7394$
Auxiliary Personnel	$s^2 = \frac{20.0 - 4.2777}{11} = 1.429$	$s^2 = \frac{42.0 - 12.5}{17} = 1.7353$
Learning Package	$s^2 = \frac{9 - 1.3333}{11} = 0.697$	$s^2 = \frac{34.0 - 2.7222}{17} = 1.8399$

---

Table 5.9. Variances of teacher satisfaction--F ratios<sup>††</sup>


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Homogeneity Tests	
<u>Large Group Instruction</u>	
$F_{17, 11} = \frac{1.4477}{0.8106} = 1.786$	No Significant Difference
<u>Small Group Instruction</u>	
$F_{11, 17} = \frac{3.674}{2.735} = 1.343$	No Significant Difference
<u>Independent Study</u>	
$F_{11, 17} = \frac{2.0966}{1.2026} = 1.7434$	No Significant Difference
<u>Team Teaching</u>	
$F_{17, 11} = \frac{0.6438}{0.4602} = 1.399$	No Significant Difference
<u>Behavioral Objectives</u>	
$F_{11, 17} = \frac{1.614}{0.7394} = 2.183^{\#}$	Significant Difference @ 0.10 <sup>#</sup>

---

<sup>††</sup> Tabled $F_{11, 17}$ @ 1.99 = .10 2.41 = .05 3.52 = .01	<sup>††</sup> Tabled $F_{17, 11}$ @ 2.18 = .10 2.70 = .05 4.21 = .01
<sup>#</sup> p < 0.10.	



Table 5.9. (Continued)

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Auxiliary Personnel

$$F_{17, 11} = \frac{1.7353}{1.429} = 1.214$$

No Significant Difference

Learning Package

$$F_{17, 11} = \frac{1.8399}{0.697} = 2.6397^{\#}$$

Significant Difference @ 0.10<sup>#</sup>

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## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## Summary

The development and testing of two methods of in-service teacher training for the improvement of nonpublic secondary school instruction was the purpose of this investigation. Split-plot design analysis of variance, Scheffé's S and the student's t tests were the statistical techniques used to treat the data and to determine which method was the more effective. The criteria variables were post-tests scores and questionnaire responses.

Two treatments were used in each of five workshops. The participants in each workshop were randomly assigned to the treatments. Learning packages, ( $a_2$ ) which had been developed by Manatt and Meeks (102) were used for one treatment. Another group was taught conventionally ( $a_1$ ); this approach included the use of lecture, small group discussion, transparency presentations, movies, filmstrip and tape independent study, as well as reading of selected journal and magazine articles.

Upper division students in secondary teacher education at Union College, forty in number, and fifty-two nonpublic secondary school classroom teachers and administrators comprised the sample. Each of the subjects was pre-tested; subsequently each was post-tested three times: once, immediately after the workshop; again, six weeks later; and finally, six months later. Two in-service teachers did not return all of the post-tests and therefore, their data were not included in the analysis.

Five null hypotheses were tested to determine method effectiveness, persistence of cognitive learning, actual practice and personal

satisfaction. More specifically, answers were sought to the following related questions.

### Question 1

Is an understanding of improving instruction grasped as effectively by the use of the conventional instruction method as by the use of the learning activity packages?

A significant F ratio was found in the Post-Test Three total scores only; this favored the conventionally-taught group ( $a_1$ ) at the 0.10 level. In this study, then, conventional instruction ( $a_1$ ) was superior to learning package instruction ( $a_2$ ). The computed equivalent gain scores showed that those who had been instructed conventionally ( $a_1$ ) had, out of a possible ninety questions, responded correctly to an average of 2.43 more than their counterparts ( $a_2$ ) as revealed in Table 1.5.

### Question 2

Does cognitive learning resulting from exposure to conventional instruction or learning activity packages, persist over a given period of time? (For example: from six weeks to six months later).

After six months, the conventionally instructed persons ( $a_1$ ) scored higher, on Post-Test Three totals, than the learning package group at a significant level, (0.10); while there was no significant difference between methods immediately after the workshop, there was a very highly significant loss, (0.01) for both groups, from Post-Test One to Post-Test Two. See Table 2.1. Over a period of time (six weeks after the workshop) the participants experienced some forgetting of their

learning. The conventionals ( $a_1$ ) lost an average of 3.5 points as compared to 5.5 for the learning package group ( $a_2$ ) between Post-Test One and Post-Test Two. This loss was not significantly different between the two groups as presented in Table 1.4.

Both groups showed some total score average gain on Post-Test Three (administered six months after the workshop) but the improvement for the conventionally instructed group ( $a_1$ ) as compared with those instructed by learning packages ( $a_2$ ) was higher at a significant level (0.10). It may then be concluded that the cognitive learning did persist over a period of time. While both groups scored higher six months after the workshop than they had after six weeks, there was found a significant difference at the 0.10 level in favor of the group which had been instructed conventionally ( $a_1$ ).

### Question 3

Which method is more effective with in-service personnel when matched with any of the following eight phases identified by Meeks: philosophy and attitudes, behavioral objectives, large and small-group instruction, independent study, auxiliary personnel or learning packages?

No significant differences were found in any of the total comparisons or the eight sub-comparisons for in-service personnel except one. A significant difference (0.10) was found between the two methods on the total scores for Post-Test One. In-service personnel who had been instructed by learning package ( $a_2$ ) earned total scores which were significantly higher (0.10), immediately after the workshop, than their counterparts ( $a_1$ ). This short-term superiority, which did not continue,

may have been due to the fact that the conventionally instructed persons ( $a_1$ ) were primarily dependent upon their own notes for review purposes while their counterparts had learning packages available; however, this difference may have been due to chance variation. During the remaining post-tests, both methods were equally effective with in-service personnel.

Both groups showed very highly significant (0.01) losses between the workshop and the six weeks tests, as might have been expected, but both also showed very highly significant (0.01) mean score gains between measurements at six weeks and six months after the workshop. See Table 3.6. There was no significant difference between the two methods except at the time of the first post-test.

#### Question 4

Which method is more effective with pre-service personnel when matched with any of the eight phases?

No significant F ratios were found in subscores or total scores for pre-service personnel when comparing methods. Both groups experienced a very significant loss (0.05) between the workshop and the administration of Post-Test Two, six weeks later, after which there was no further significant loss.

#### Question 5

Which method is more effective in producing evidence of change in teacher behavior and satisfaction over a given period of time?

Practices In practice, the teachers showed some increase in the use of large group instructional time between the fall of 1970 and the spring of 1972 (35.5 to 38.7 for conventionals ( $a_1$ ) and 34.2 to 40.8

percent for learning package instructees ( $a_2$ )). Use of small group instruction was increased two-and-a-half times by the conventionally instructed group ( $a_1$ ), (9.5 to 25.7 percent) and four times by those who studied learning packages ( $a_2$ ), (6.4 to 24.5 percent). Apparently, large and small group instructional time was increased at the expense of independent study time. This occurred, perhaps, because it seems that small group instruction is one of the easier New Design concepts to implement and/or class time ordinarily used for supervised study and called independent study was appropriated. In all of the other concepts measured, including independent study, behavioral objectives, team teaching, pre- and post-testing, use of community resource people and student aides, teaching practice evidenced a decrease, from slight to marked, with two exceptions. The learning package group ( $a_2$ ) increased their use of pre-tests two-and-a-half times (4 to 10 percent of the units taught). Those who had been taught conventionally ( $a_1$ ) used student aides more than two-and-six-tenths times as long per week in 1972 as they had in 1970 (126 to 334 minutes per week).

Satisfactions Both groups of teachers reported positive satisfaction with the techniques: large-group instruction, small group instruction, independent study, behavioral objectives, team teaching, auxiliary personnel, and learning packages, even though this attitude is not consistently revealed in their practices. No statistically significant differences were found between the methods in changing the average teacher's satisfaction with the various New Design components; satisfaction or dissatisfactions remained virtually unchanged during the period

under investigation. This apparent static satisfaction factor actually may reflect dissatisfaction. The rating of teaching practice (fall, 1970) may have reflected a lack of familiarity with New Design concepts and thus allowed for rather naive satisfaction to be reported. After the treatment and some implementation of the concepts, however, the teachers actually may have been more critical of themselves and had higher expectation levels of quality New Design strategies than they had possessed previously.

#### Limitations

This study was limited to those teachers in four selected secondary schools and to upper division students enrolled in teacher education at Union College; participation was largely a matter of administrative decision. While the total number of participants was not large, it was equal to a substantial portion of the target population, (approximately 40 percent of the secondary teacher education students and 35 percent of the teachers in the Seventh-day Adventist secondary schools in Colorado, the Dakotas, Iowa, Kansas, Minnesota, Missouri, and Nebraska).

Eight phases of the New Design, which had been identified by Meeks as those with which teachers were most desirous of assistance, were taught in three-day workshops after which there was little opportunity for further reinforcement.

Two methods of in-service training were tested and evaluated; they were conventional ( $a_1$ ) and learning package ( $a_2$ ) instruction.

Role orientation was another limitation. Immediately after the administration of the pre-test to all participants and the random assignment to treatment groups, a short orientation session was held; this

motivational experience might have been more dynamic.

No attempt was made to minimize the "Hawthorne Effect," however, its influence should have been roughly equal for both groups. All of the participants were informed of the experimental nature of the workshop and the possible use to be made of the data. Cooperation was solicited and the differences between the roles of the two groups were explained. The members of the conventional group ( $a_1$ ) were asked not to discuss New Design Concepts with members of the learning package group and vice versa. It was explained that the purpose of this request was to reduce experimental contamination as much as possible.

A further limitation was the lack of cost/benefit analysis. It has been found that learning packages are less efficient than professor-oriented instruction, but nonetheless, they are less costly. Substantial cognitive learning (from learning package instruction) did persist over a period of time. In the real world, this well may have been sufficient when considering the lower cost per unit of instruction.

The use of two different forms of the evaluation instrument was another limitation; it may well be that less complicated statistical procedures would have been necessary to test Hypotheses One through Four if the same instrument had been used repeatedly.

#### Recommendations to Practitioners

The following recommendations are offered to those involved in in-service training:

1. Probably, a strategy which utilizes both conventional and learning



package instructions would be most advantageous. (Indeed, such a workshop was conducted in August, 1972 for a group of nonpublic secondary school teachers.)

2. Conventional instruction should include: large group presentations with transparencies, small group instruction (social interaction), assigned reading with various options, movies, filmstrips, and tape instruction available for individual viewing.
3. Conventional instruction, as defined in this study, should be used to achieve more cognitive learning than that produced by learning packages only.
4. Conventional instruction should be used in preference to learning packages for the retention of cognitive learning over an extended period of time.
5. Pre-testing can serve to motivate learning; increased use of this technique appears warranted.
6. Learning packages may be advantageous in situations where short-term retention of learning and/or lower cost per unit is desired. It should be pointed out that packages were superior in the short run. If learning packages were to be used as a major vehicle, it would seem that the following supplementary techniques should be used also: (a) initial large group motivational instruction, (b) periodic small group instruction, (c) opportunity for one-to-one interaction with the instructor, and (d) positive reinforcement via multidimensional learning materials and activities.
7. In-service programs are most successful in situations where the

teachers have a felt need for self improvement and share in the planning for such experiences.

#### Recommendations for Further Research

1. Research is needed to develop and determine better ways to evaluate the effectiveness of in-service workshops.
2. Longitudinal studies should be made of the ultimate value of pre- and in-service training experiences, thus paving the way for vigorous studies of competency based preparation of teachers.
3. Future experimentation should be made which would compare learning packages such as used in this study with those which would make extensive use of tapes, filmstrips, and other supporting media.
4. There is a need to know, with more precision, those strategies which really change people's attitudes and behavior; perhaps workshops are contra-productive for this purpose.
5. The roles of administrators in effecting positive change in teachers needs to be studied.
6. With the emerging of competency-based instruction (CBI) on the pre-service level there is need to compare CBI with humane, creative, yet more conventional programs.

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**APPENDIX A**

## NEW DESIGN

## EXAM A

Manatt  
Meeks

(Choose the answer which is more nearly correct)

True or False

1. A computer generated flexible schedule is advisable in the large high school.
2. Only a little time can be devoted to change because most efforts have to be devoted to just keeping the schools operating.
3. The time allotments for a learning activity must be appropriate to its purpose.
4. The major responsibility for evaluation of students goes to guidance, not teachers.
5. The "situation" is essential in stating objectives.
6. It is not practical to write objectives for some subjects.
7. The following is a well-stated objective: "Students will be able to read, write and use scientific measures."
8. The following is a well-stated objective: "Explain an omnibus word by identifying three such words and giving an example of each."
9. The standard within an objective must be clearly stated.
10. The following is a well-stated objective: "After completing the unit on dressmaking the student will alter the hem on a dress."
11. The roles of the intern and first year teacher must be clearly differentiated as members of a team.
12. Student teachers roles are confined to working with SGI.
13. A strong personality, a forceful, imaginative teacher will probably perform better as an individual than as a team member.
14. Ordinarily a secondary school team will be given responsibility for one subject for a group of students.
15. Team teaching is a cooperative venture and it's more fun.
16. Team teaching is a more economical way to utilize the teaching staff.

17. A teaching team has a minimum of three members.
18. J. Lloyd Trump was an advocate of team teaching.
19. Role-playing can be effectively achieved in LGI.
20. The main criteria for selecting a large group area is to have a space large enough to seat the class.
21. LGI is teacher-centered.
22. Any teacher can become a good LG presenter.
23. LGI makes it possible for the master teacher to become exposed to the masses of students.
24. Small group instruction is probably the most effective phase of New Design instruction.
25. SGI can be used with heterogenous ability groups.
26. It is expensive to furnish a SGI area.
27. Each student should become actively involved in SGI.
28. Both LGI and SGI give the student the opportunity to verbally express himself.
29. SGI is likely to be more effective in groups of eight or less.
30. A flexible modular schedule is essential for effective SGI.
- 2-1. Where there are subject matter resource centers, it is not uncommon to have a decentralized library.
- 2-2. A learning package is an excellent means of learning a concept during IS.
- 2-3. A student might have as little as 15 percent or as much as 70 percent IS time.
- 2-4. One of the keys to a successful IS program is the facilities which are available.
- 2-5. Teachers should have the power to release students from their scheduled class.
- 2-6. "Free time" is a term which should be used to identify the un-scheduled time of students.

- 2-7. There is a trend toward having intern programs for inexperienced teachers.
- 2-8. One of the main reasons for having teacher aides is to release teachers more to work with individual students.
- 2-9. There are some tasks which can be done better by a nonprofessional than by a teacher.
- 2-10. A fear which teachers have had is that an aide will do educational harm to a child.
- 2-11. Teachers have no difficulty in knowing how to use aides.
- 2-12. Volunteer aide programs have not proven very successful.
- 2-13. A learning package is a lesson plan.
- 2-14. A learning package can depend on many activities which are not included in the package.
- 2-15. Learning packages are used more effectively in a subject-centered curricula.
- 2-16. A flexible modular schedule is essential to the success of a learning package.
- 2-17. A post-test is a basic ingredient of a learning package.
- 2-18. In a LP, a concept is a single learnable idea, skill, attitude.
- 2-19. The pre-test of a LP must be written before anything else is done.

### Multiple Choice

- 2-20. Which is not a means of evaluating the New Design?
  - 1. A survey of letter grades (A,B,C,)
  - 2. Pre- and post-testing
  - 3. Attitude studies
  - 4. Dropout and absenteeism studies
- 2-21. Why was a commercial operator (Dorsett) contracted to teach reading and math to the Texarkana Arkansas public schools?
  - 1. Dorsett was able to provide outstanding equipment.
  - 2. As a result of the teacher shortage, teachers were not available to teach the skills.
  - 3. Federal funds were available for this experiemnt.
  - 4. The traditional approach had not been successful.

- 2-22. Why do students like the New Design schools?
1. They feel that the program is tailored especially for them.
  2. Their subjects are less difficult.
  3. They are not required to take as many subjects.
  4. They are not as responsible for their own learning.
- 2-23. How does a New Design elementary school differ from a conventional school?
1. It has a nongraded or continuous progress program.
  2. It has a departmental approach.
  3. Students have more physical freedom.
  4. More time is spent on skills.
- 2-24. Which is not an attempt at individualizing instruction?
1. CET
  2. PLAN
  3. SGI
  4. IPI
- 2-25. Which is not a characteristic of a computer made flexible schedule?
1. Some students will goof-off on their IS time.
  2. Some sections of the nation have no such programs.
  3. Some teachers will not change their approach.
  4. If everything clicks, it's beautiful.
- 2-26. Identify the role of the teacher in a New Design program.
1. The teacher will have less responsibility.
  2. Better staff utilization will require less work from the teacher.
  3. The teacher will have less time for planning.
  4. The teacher will have more professional responsibility.
- 2-27. Which is not a criterion necessary to become a good writer of behavioral objectives?
1. See the need.
  2. Become knowledgeable on how to write them.
  3. Practice--write, write, write.
  4. Flexible modular schedule.
- 2-28. Which of the following terms identifies the "situation within an objective"?
1. Presented with
  2. Reviewed
  3. Compared
  4. All of the above



2-29. Which of the following criterion is essential for well stated objectives?

1. Standard
2. Performance
3. Learner
4. All of the above

2-30. It is more difficult to write objectives in:

1. The cognitive domain
2. The skill areas
3. The affective domain
4. All of the above

3-1. What is the greatest problem in implementing a team teaching approach?

1. Acquiring planning time within the school day.
2. School being too small.
3. Having a traditional student schedule.
4. There are not two people teaching the same subject in some schools.

3-2. What are common blunders in teaming?

1. Turn teaching
2. Being scared of peer supervision
3. Being assigned too few students
4. All of the above

3-3. In requesting time for LGI, SGI, IS, teaching teams:

1. Have difficulty thinking outside the realm of their past experience.
2. Usually do not schedule enough time for LGI.
3. Usually schedule students to too much SGI time.
4. Are confined to the limitations of the schedule as determined by administration.

3-4. Which is a responsibility of the senior teacher?

1. Team leadership
2. Assign staff
3. Leadership in curriculum design
4. All of the above

- 3-5. What is the greatest problem of an ongoing team teaching experience?
1. Individual teachers who are not members of a team can work better with individual students.
  2. The incompatibility of the members of the team.
  3. SGI does not lend itself to team teaching.
  4. Teachers prefer to work individually.
- 3-6. Which is not an advantage of team teaching?
1. Conserves teacher time.
  2. Makes optimum use of teacher's talent.
  3. Fewer teachers are needed to staff a program.
  4. Makes elementary school teaching more attractive.
- 3-7. Why do teachers spend more time on preparing for large group instruction than the other modes?
1. Usually the learning of large numbers of students is at stake.
  2. Preparation time for LGI is set aside.
  3. Usually a team mate is observing the presentation.
  4. All of the above.
- 3-8. Which activity does not lend itself to LGI?
1. Giving a test.
  2. Viewing a film.
  3. Giving a lecture.
  4. Discussing a topic.
- 3-9. Which is not an accurate statement about LGI?
1. Classes need to be scheduled.
  2. Takes much preparation time.
  3. Usually a large number of students.
  4. Meets more frequently than other modes.
- 3-10. What can be said about the LGI mode in the New Design program?
1. Most important mode of instruction.
  2. An important mode of instruction.
  3. One of two modes of instruction.
  4. Essential for laboratory work.
- 3-11. Which is the best estimate of how long a LGI should be?
1. Seventy minutes.
  2. Ten minutes.
  3. Thirty minutes.
  4. Fifty minutes.

- 3-12. Small group instruction gives students and teacher an opportunity to:
1. Plan a unit.
  2. Dispense information.
  3. Interpret information.
  4. All of the above.
- 3-13. Which is the primary requirement of SGI?
1. Teacher must have a positive attitude toward SGI.
  2. Teacher must realize that the material must be covered.
  3. The subject for which the teacher is responsible must be learned.
  4. All of the above.
- 3-14. Which of the following can not be said about SGI?
1. Teacher may need to be in the background.
  2. Students can help plan SGI.
  3. The teacher should use gimmicks if necessary.
  4. There should not be a moment's silence.
- 3-15. Which is not a role of the student in SGI?
1. The student is a participator.
  2. The student should respect opinions of others.
  3. The student should not hitchhike off the ideas of others.
  4. The student should answer questions.
- 3-16. In developing an independent study orientation program for the parent, which statement is true?
1. A well planned orientation program is essential for parents.
  2. The student is the best ambassador for the program.
  3. Parents relate their own education to their child.
  4. All of the above.
- 3-17. Which is not a true statement about an open lab?
1. Students use during independent study.
  2. In some cases, open labs will exist in the same room with a scheduled class.
  3. Limited to the practical arts and natural sciences.
  4. It may or may not be under the supervision of a teacher.

- 3-18. Check the essential criteria which is needed for a successful IS program.
1. IS orientation program for students.
  2. A spacious learning center.
  3. A student lounge.
  4. All of the above.
- 3-19. Which of the following is not one of the fears which teachers have about IS?
1. Evaluating the student's IS performance.
  2. Students won't have enough to keep them busy.
  3. Lack of supervision--legal liability.
  4. Students will not use their time wisely.
- 3-20. How much of a student's time should be devoted to independent study?
1. Depends on student.
  2. Depends on teacher.
  3. Depends on subject.
  4. Depends on whether there is a modular schedule.
- 3-21. Where can students spend their IS time?
1. Outside the school building.
  2. In a resource center.
  3. In a small group.
  4. All of the above.
- 3-22. What is the main purpose in having teacher aides?
1. Decrease teacher-pupil ratio.
  2. Provide employment for needy.
  3. Give teacher opportunity to use time wisely.
  4. A key to implementation of a modular schedule.
- 3-23. An aide may be:
1. An adult.
  2. A student.
  3. A volunteer.
  4. All of the above.
- 3-24. What kind of aide duties do students perform?
1. Supervision.
  2. Preparing filmstrip.
  3. Tutoring.
  4. Both two and three above.

- 3-25. What does a resource center aide do?
1. Student supervision.
  2. Branch librarians.
  3. Audio-visual assistant.
  4. All of the above.
- 3-26. Which is not a professional task of the teacher?
1. Supervising students who are working independently.
  2. Diagnosing the needs of the student.
  3. Prescribing instructional activities.
  4. All of the above.
- 3-27. Which of the following is a basic component of a learning package?
1. A major concept.
  2. Behavioral objectives.
  3. A pre-test.
  4. All of the above.
- 3-28. Which of the following titles seem to be too long for the length of a LP?
1. History of Socialism.
  2. Principles of Flight.
  3. Introduction to the slide rule.
  4. Drug abuse.
- 3-29. The pre-test can take the form of:
1. Checklists.
  2. Performance measures.
  3. Essay questions.
  4. All of the above.
- 3-30. A learning package is:
1. A programmed text.
  2. A curriculum guide.
  3. A workbook.
  4. None of the above.
- 4-1. What is your sex?
1. Male
  2. Female

4-2. How many years have you been in the teaching profession?  
(Include administration etc.)

1. 0-5
2. 6-10
3. 11-20
4. 20 or more

4-3. What is your major responsibility?

1. Teacher
2. Counselor
3. Administrator
4. Other

4-4. Do you consider your school innovative?

1. yes
2. no
3. uncertain

4-5. At which level do you work?

1. Elementary
2. Middle or Junior High
3. Senior High

## NEW DESIGN

## EXAM B

Manatt  
Meeks

(Choose the answer which is more nearly correct)

True or False

- 1-1. A flexible modular schedule will assure an individualized, exciting school.
- 1-2. There has been no major widespread change in methodology in the schools during modern times.
- 1-3. The public is uninformed about educational innovations.
- 1-4. Youth rebellion is not related to the shortcomings of the school.
- 1-5. It is easy to state objectives in behavioral terms in all areas.
- 1-6. Learning must be measured in terms of the student's change in behavior.
- 1-7. Almost any verb can be used to properly state objectives in behavioral terms.
- 1-8. The following is a well stated objective: "Given a list of products, the student will be able to write the name of the basic industry from which the product was produced accurately."
- 1-9. The following is a well stated objective: "Create a checklist that includes at least four items that will help us analyze propaganda."
- 1-10. The following is a well stated objective: "Upon the completion of Unit I in Spanish, the learner should be able to recognize the Spanish terms."
- 1-11. Team teaching is essential to a flexible modular schedule.
- 1-12. A teaching team should have a voice in determining how its IS time will be used.
- 1-13. The size of the group should determine the type of learning activity.
- 1-14. An elementary school team is often given a group of students and then expected to provide all basic subject instruction for them.
- 1-15. The American educational system has introduced the teaming approach to business and industry.

- 1-16. Eventually, probably all teachers will be a member of a team.
- 1-17. Team teaching has not proven itself yet.
- 1-18. Team teaching is a handy tool to use in the LGI, SGI, IS approach.
- 1-19. A mini course can be used to give the student the opportunity to study something of interest which is not offered in a regular course.
- 1-20. Team teaching is essential to a New Design program.
- 1-21. Large group instruction is used to motivate students.
- 1-22. When implementing a New Design, most schools set aside more LGI areas than are needed.
- 1-23. Students will spend less time in LGI than they will in other modes of instruction.
- 1-24. It likely will take two or three hours preparation for every hour of LG presentation.
- 1-25. LGI is for seat work.
- 1-26. Small group instruction is primarily characterized by a certain number of students.
- 1-27. It has been just in the past decade that SGI has come into use.
- 1-28. SGI sections must be administratively scheduled.
- 1-29. Small group instruction is a teacher centered activity.
- 1-30. A teacher can only supervise one small group at a time.
  - 2-1. An ideal SGI area is comfortable and attractive.
  - 2-2. A teacher's independent study or unscheduled time should all be reserved for planning.
  - 2-3. Day-to-day assignments are more effective than long range assignments.
  - 2-4. Students should have an opportunity to take a break just as adults do.
  - 2-5. Teachers find it relatively easy to adapt to having students have a large portion of their time unscheduled.



- 2-6. In spite of administrative fears, all students will use their IS time wisely.
- 2-7. Quest programs make it possible for students to pursue their own interests in depth.
- 2-8. The study carrel can be used for small group discussion.
- 2-9. Community resource persons to assist the teacher have not proved very successful in most cases.
- 2-10. No specialized training is required for an aides position.
- 2-11. The nonprofessional can never replace all of the teachers.
- 2-12. There should always be an understanding that the aides are not a part of the regular staff.
- 2-13. A workshop for aides should complete all of the needed orientation.
- 2-14. A school system which employs aides is more expensive to operate.
- 2-15. A learning package can be self-instructional.
- 2-16. A learning package is a gimmick.
- 2-17. It's important that all learning packages have certain basic components.
- 2-18. Quest activities need not be included in a LP.
- 2-19. All learning in the school takes place with the individual student using L Packages.
- 2-20. L Packages determine the curriculum.

#### Multiple Choice

- 2-21. Follow-up studies of the New Design have shown that:
  - 1. Parents prefer the new program.
  - 2. Students are absent from school more.
  - 3. Students rate LGI as their favorite activity.
  - 4. Teachers prefer the New Design to the conventional.

- 2-22. Which is a less accurate statement pertaining to change in the public schools?
1. More money must be spent on education.
  2. Teacher's attitudes must change.
  3. Curriculum must change.
  4. The role of the student must change.
- 2-23. It has been observed that kids like school when they start kindergarten but each year they are in school they have less enthusiasm for it. Why do you suppose this is true?
1. Educational programs are not relevant.
  2. Parents de-emphasize school in the upper grades.
  3. Tax payers are not supporting their local schools.
  4. School enrollments are growing too rapidly.
- 2-24. In implementing the New Design by adopting a flexible modular schedule what would not be a teacher's change-over task?
1. Determine time needed for LGI, SGI, IS.
  2. Build discussion and activities into SGI to fit LGI.
  3. Write well stipulated lesson plans.
  4. Plan and implement Quest and Learning packages for IS time.
- 2-25. Which is not an objective of flexible modular scheduling?
1. To provide more opportunities for individualized instruction.
  2. To provide teachers with the opportunity to have more planning time.
  3. To provide more opportunities for better staff utilization.
  4. To teach students to become more responsible for their learning.
- 2-26. Who coined the term "New Design"?
1. Trump
  2. Conant
  3. Rickover
  4. Bush and Allen
- 2-27. "New Design" programs are best characterized by:
1. A flexible modular schedule.
  2. An individualized approach.
  3. The utilization of a differentiated teaching staff.
  4. Large and small group instruction.

- 2-28. Why should objectives be measurable?
1. To determine when the goal is reached.
  2. To get the necessary material covered.
  3. To determine if the teacher is effective.
  4. All of the above.
- 2-29. Which of the following terms best identifies behavior of an objective?
1. Explain
  2. List
  3. Understand
  4. Appreciate
- 2-30. Where in education were the first behavioral objectives written?
1. In sex education.
  2. In humanities courses.
  3. In vocational and correspondence courses.
  4. In physical and biological sciences.
- 3-1. The following is a valid reason why teachers do not write behavioral objectives.
1. They don't have time to write them.
  2. Teaching is an art, not a science.
  3. They don't know how to write them.
  4. All of the above.
- 3-2. Teams of teachers providing a continuous progress program can:
1. Compensate for lacking teacher expertise.
  2. Save the school district money.
  3. Have more time to work with groups rather than individuals.
  4. Give more support to administrative responsibilities.
- 3-3. What are the characteristics of the position of staff teacher?
1. Makes up the bulk of the staff.
  2. Accepts role of team leader.
  3. Will not have acquired the Master's Degree.
  4. Solely responsible for large group instruction.
- 3-4. Which is not an instructional mode for a team of teachers?
1. LGI
  2. RC
  3. SGI
  4. IS

- 3-5. All of the professional members of a team are exposed to:
1. Evaluation
  2. Diagnosis
  3. Prescription
  4. All of the above
- 3-6. Which of the following is not a criteria for determining team size?
1. Districts staffing ratio.
  2. The ability of the students.
  3. Whether or not two subjects are combined.
  4. Available facilities.
- 3-7. Which of the following is not commonly used in large group instruction?
1. Opaque projector, overhead
  2. PA System
  3. Head phones
  4. Film projector (Strip and movie)
- 3-8. LGI gives the teacher the opportunity to be a:
1. Performer
  2. Listener
  3. Friend of the students
- 3-9. The best LGI teachers are:
1. Exciting, enthusiastic
  2. Well organized
  3. A good speaker
  4. All of the above
- 3-10. Pertaining to checking attendance in LGI, what can be said?
1. Someone other than the presenter should take attendance.
  2. Attendance should not be taken at all.
  3. A teammate must take attendance.
  4. The presenter should take attendance.
- 3-11. Large group instruction is best recognized by:
1. A large group of students.
  2. Teacher-centered activity.
  3. Student-centered activity.
  4. An informal setting.

- 3-12. What is the role of the teacher in small group instruction?
1. The teacher is the presenter of material.
  2. The teacher is the "fountain of knowledge."
  3. The teacher is an "organizer of learning."
  4. The teacher is the leader of the group.
- 3-13. The number of SGI meetings per week will be determined by:
1. Subject taught or topic discussion.
  2. Number of the group.
  3. Ability of students.
  4. None of the above.
- 3-14. What kind of facility is needed for SGI?
1. Movable furniture is a must.
  2. Tables are needed.
  3. With carpeting, perhaps no furniture is needed.
  4. All of the above.
- 3-15. Which is not a technique a teacher is to use in guiding SGI?
1. Have students raise hand before speaking.
  2. BE a good listener.
  3. Sit inconspicuously with students.
  4. Attempt to involve all students.
- 3-16. Which of the following criteria is conducive to effective SGI?
1. Proper attitude of teacher.
  2. Fifteen students or less.
  3. High School age students.
  4. All of the above.
- 3-17. What kind of different settings should be available for independent study?
1. Video tape recorder.
  2. Colorful painted walls.
  3. Study carrels.
  4. A large study hall.
- 3-18. Which of the following would not be found in the Social Studies resource center?
1. Newspapers, magazines.
  2. Calculator.
  3. Film projector.
  4. Social studies teachers.

- 3-19. In developing an IS program:
1. Day-to-day assignments should be used.
  2. Skills should be de-emphasized.
  3. Facts should be stressed.
  4. Concepts should be stressed.
- 3-20. What is the purpose in having different places for students to go on IS?
1. So students may behave differently.
  2. Facilities in most schools dictate this.
  3. Students differ in the kind of environment in which they perform best.
  4. Both 1 and 3 above.
- 3-21. What is the purpose in an honors pass system?
1. Teachers have access to students.
  2. An incentive to use IS wisely.
  3. A means of supervising low ability students.
  4. All of the above.
- 3-22. Which of the following is not a qualification of a teacher's aide?
1. College education.
  2. Compassion for children.
  3. Common sense.
  4. Ability to relate to youth.
- 3-23. Which function is an aide unable to perform?
1. Correct objective tests.
  2. Lead SGI.
  3. Set up films.
  4. Prepare bulletin board displays.
- 3-24. In which area would one find an amity aide?
1. Spanish
  2. Art
  3. Homemaking
  4. All of the above
- 3-25. What does an instructional materials aide do?
1. Sell lunch tickets
  2. Departmental secretary
  3. Make transparencies
  4. Student supervision

3-26. Which of the following tasks can an instructional aide perform?

1. Record grades.
2. Take attendance.
3. Check objective tests.
4. All of the above.

3-27. What is the difference between a learning package and lesson plans?

1. A learning package is a guide for students.
2. A Lesson Plan is a guide for the teacher.
3. A learning package is a complete array of learning activities.
4. All of the above.

3-28. What are the features of a learning package?

1. It's a set of teaching-learning materials.
2. It focuses on a single concept.
3. It's designed for independent use.
4. All of the above.

3-29. Which is not true pertaining to the length of a LP?

1. Covers one single major concept.
2. Should not take more than a few weeks to complete.
3. Should be long enough to cover the course.
4. Should not be over 15 lessons in length.

3-30. The greatest advantage of a learning package is:

1. A student will have work to do on his IS time.
2. It will free the teacher to use his time more professionally.
3. Provides the teacher with a better diagnosis of the student.
4. A student may progress at his own rate.

APPENDIX B



EDUCATIONAL PRACTICES  
Questionnaire

Name \_\_\_\_\_

Date \_\_\_\_\_

Thinking back to the fall of 1970, please answer the following questions in relation to the first semester of that school year, 1970-71. All of us realize that limitations of time, energy and finances keep us from doing everything which we would like to have done, and with this understanding, please rate your "favorite" single course taught during that time.

1. Which items made it your favorite class? Please read carefully and check the one in each pair which most nearly applies.

- \_\_\_\_\_ a. I felt adequately prepared academically.  
 \_\_\_\_\_ b. My academic preparation was not adequate.  
 \_\_\_\_\_ c. I felt uncomfortable with the subject matter.  
 \_\_\_\_\_ d. I felt more comfortable with the subject matter.  
 \_\_\_\_\_ e. I made better daily preparation.  
 \_\_\_\_\_ f. It did not require too much daily preparation.  
 \_\_\_\_\_ g. The subject matter was unimportant but had to be taught.  
 \_\_\_\_\_ h. I felt that the subject matter was highly important.  
 \_\_\_\_\_ i. Other (please specify) \_\_\_\_\_  
 \_\_\_\_\_ j. The students were superior intellectually.  
 \_\_\_\_\_ k. The students were average intellectually.  
 \_\_\_\_\_ l. The students were not enthusiastic about learning the subject matter.  
 \_\_\_\_\_ m. The students were highly motivated to learn.  
 \_\_\_\_\_ n. The surroundings (room, atmosphere, etc.) were conducive to learning.  
 \_\_\_\_\_ o. The surroundings (noise, odors, etc.) detracted from learning.  
 \_\_\_\_\_ p. The instructional materials were adequately available.  
 \_\_\_\_\_ q. There was a shortage of needed instructional materials.  
 \_\_\_\_\_ r. I did most of the planning.  
 \_\_\_\_\_ s. The students shared in the planning.  
 \_\_\_\_\_ t. Other (please specify) \_\_\_\_\_

2. Name of course which you have designated above. \_\_\_\_\_

3. How many minutes per week, total time, do you estimate that a typical student spent for your class? \_\_\_\_\_ minutes per week in class and out.

4. Of the total time spent by a typical student, what fractions of that time were spent in the following activities:

Fractions

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- \_\_\_\_\_ a. Creative, enthusiastic, efficient, well-illustrated lecturing, demonstration, questioning, etc.
- \_\_\_\_\_ b. Interacting discussion groups of not more than 4-12 students.
- \_\_\_\_\_ c. Learning experiences, either teacher or student directed, other than homework, which help the student become more responsible, intelligent, creative, thorough.
- \_\_\_\_\_ d. Homework
- \_\_\_\_\_ e. Other (please specify) \_\_\_\_\_

1 TOTAL: Please be sure that your fractions total a whole unit.

5. How many learnable ideas (major concepts) did you teach in this course?  
\_\_\_\_\_ (a number)

6. Of the learnable ideas which you taught, what fraction of them were planned and/or taught with the assistance of other persons? \_\_\_\_\_ (a fraction)

7. Of the learnable ideas taught (in the above class) what fraction of them were taught to meet specific objectives which were given to the students beforehand, so that he understood the performance which would be expected of him after the learning experience? \_\_\_\_\_ (a fraction)

8. What fraction of the total learnable ideas were taught using individual instructional modules providing rationale, feedback, learning experiences, a statement of terminal abilities, skills, attitudes, etc.? \_\_\_\_\_ (a fraction)

9. Did you use a pre-test for the course? YES \_\_\_\_\_ NO \_\_\_\_\_

10. How many instructional units (as you define them) were included in the course? \_\_\_\_\_ (a number)

11. For how many instructional units (as you define them) did you use a unit pre-test? \_\_\_\_\_ (a number)

12. Did you use a post-test for the course? YES \_\_\_\_\_ NO \_\_\_\_\_

13. For how many instructional units (as you define them) did you use a unit post-test? \_\_\_\_\_ (a number)

14. Did you have the assistance of STUDENT READERS? YES \_\_\_\_\_ NO \_\_\_\_\_

15. If the answer to #14 is YES, how much total time, in minutes per week, were READER services available to you for the above mentioned class?  
\_\_\_\_\_ minutes per week.

16. Of the total time during which READERS services were available to you each week, what fraction of that time was spent in the following activities?

- \_\_\_\_\_ a. Supervise bus loading and unloading
- \_\_\_\_\_ b. Assist kids before school
- \_\_\_\_\_ c. Supervise lunch, recess and free periods
- \_\_\_\_\_ d. Make routine announcements
- \_\_\_\_\_ e. Receive (from parents and/or school secretary) requests for supplies and materials
- \_\_\_\_\_ f. Check attendance
- \_\_\_\_\_ g. Get out and put away instructional materials requested by teacher
- \_\_\_\_\_ h. Handle routine operation of mechanical aides to instruction
- \_\_\_\_\_ i. Collect milk and lunch money
- \_\_\_\_\_ j. Act as "substitute" nurse for minor first aid procedures

- k. Operate duplicator
- l. Assemble duplicated materials
- m. Correct objective tests
- n. Inventory supplies and materials
- o. Supervise independent study
- p. Receive (from school office and/or parents) messages or forgotten items
- q. Assist with student weight and measurement records
- r. Make entries on pupil progress charts
- s. Type and prepare other instructional materials
- t. Other (please specify) \_\_\_\_\_

1 TOTAL: Please be sure that your fractions total to equal a whole unit.

17. What was the average remuneration per hour for a READER? \_\_\_\_\_

18. Did you have any unpaid READERS? YES \_\_\_\_\_ NO \_\_\_\_\_

19. If the answer to #18 is YES, how much time, in minutes per week, did READERS give you volunteer help? \_\_\_\_\_ minutes per week

20. How many visitors or people from the community did you use for:
- a. Resource persons
  - b. Discussion leaders
  - c. Speakers
  - d. Presenters
  - e. Other (please specify) \_\_\_\_\_

21. On the basis of your responses to the items in this questionnaire, please identify the instructional skills or techniques in which you find satisfaction. Check in the appropriate box.

	Dissatisfaction			Satisfaction		
	most	more	some	some	more	most
	0	1	2	3	4	5
a. Creative, enthusiastic, efficient, well-illustrated lecturing, demonstration teaching, etc.						
b. Discussion groups of not more than 4-12 students.						
c. Interacting, learning experiences, either teacher or student directed, other than homework, which help the student become more responsible, intelligent, creative, thorough.						
d. Planning and/or teaching in association with other persons.						
e. Objectives in which the student is told, beforehand, that which would be expected of him after the learning experience.						
f. Learnable ideas taught using instructional modules in which rationale, feedback, learning experiences, a statement of expected terminal abilities, skills, attitudes and/or other possibilities were provided.						
g. Use of student help or volunteers for grading papers, help on field trips, resource persons, discussion leaders, speakers, etc.						

Name \_\_\_\_\_ Date \_\_\_\_\_

Time limitations prevent each of us from doing everything which we would like to do. With prior agreement to this concept, please rate your "favorite" single class taught during the present semester or quarter (Spring 1972).

- The class which you most enjoy teaching is probably your "favorite." Those characteristics which add to your teaching satisfaction have been designated ATTRACTORS--those which do not give you this satisfaction are termed DETRACTORS. Place a plus sign, on the lines below the term ATTRACTORS, opposite those characteristics which add to your teaching satisfaction, place a minus sign, on those lines under DETRACTORS, opposite those characteristics which take away from your teaching satisfaction. Mark one or the other only for each characteristic. Leave the line blank if the characteristic neither attracted to nor detracted from your class.

ATTRACTORS	Class Characteristic	DETRACTORS
_____	a. student aid in planning	_____
_____	b. student intellectual ability	_____
_____	c. student enthusiasm	_____
_____	d. other (please specify)	_____
_____	_____	_____
_____	e. physical conditions	_____
_____	f. instructional materials	_____
_____	g. other (please specify)	_____
_____	_____	_____
_____	h. importance of subject matter	_____
_____	i. daily preparation required	_____
_____	j. personal comfort with subject matter	_____
_____	k. personal academic preparation	_____
_____	l. other (please specify)	_____

2. Please name your favorite class. \_\_\_\_\_

3. How many minutes per week, (total time in class and out) do you estimate that a typical student spends for your class? \_\_\_\_\_ minutes per week

4. Of the total time spent by a typical student for your class each week, what percentage of his time would you estimate is spent in LARGE GROUP INSTRUCTION? (Please place a check on the continuum at that point which represents that percentage.)



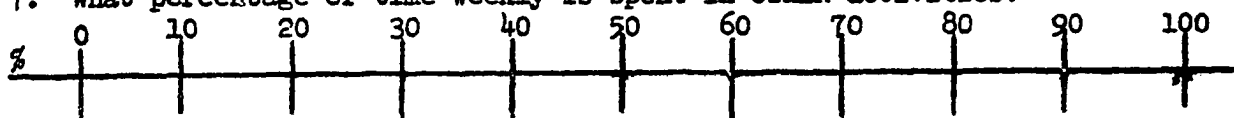
5. What percentage of time weekly is spent in SMALL GROUP INSTRUCTION (in the above class)?



6. What percentage of time weekly is spent in INDEPENDENT STUDY and/or Quest projects (in the above class, including homework)?



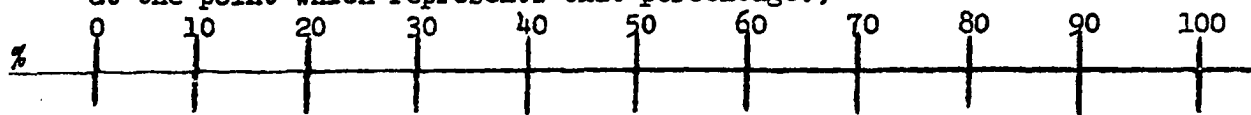
7. What percentage of time weekly is spent in OTHER activities?



8. Please specify the other activities \_\_\_\_\_

9. How many major concepts (large learnable ideas, as you delimit them) did you teach in this course? \_\_\_\_\_ (a number)

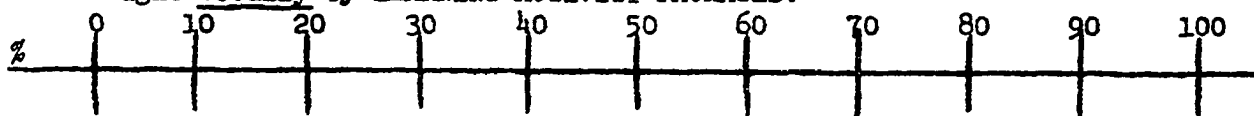
10. What percentage of the concepts which you teach (in the above class) are taught to meet BEHAVIORAL OBJECTIVES which you have shared with students before the learning activities take place? (Place a check on the continuum at the point which represents that percentage.)



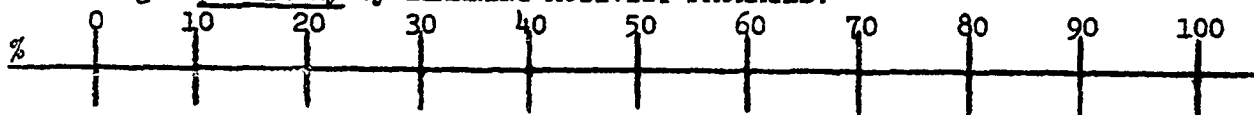
11. What percentage of the concepts which you teach (in the above class) are TEAM TAUGHT?



12. What percentage of the concepts taught in the above mentioned class are taught totally by LEARNING ACTIVITY PACKAGES?



13. What percentage of the concepts taught in the above mentioned class are taught partially by LEARNING ACTIVITY PACKAGES?



14. How many instructional units (as you define them) were included in the course? \_\_\_\_\_ (a number)

15. Did you use a pre-test for the entire course? Yes \_\_\_\_\_ No \_\_\_\_\_

16. For what percentage of the instructional units (as you define them) did you use a unit pre-test?



17. Will you use a post-test for the entire course? Yes \_\_\_\_\_ No \_\_\_\_\_

18. For what percentage of the instructional units (as you define them) did or will you use a unit post-test?



19. Do you have the assistance of TEACHER AIDES or STUDENT READERS? Yes \_\_\_ No \_\_\_

20. If the answer to #19 is Yes, how much total time, in minutes per week, are AIDE or READER services available to you for the above mentioned class? \_\_\_\_\_ minutes per week (both volunteer and paid)

21. What is the average remuneration per hour for a READER? \_\_\_\_\_

22. Do you have any unpaid student or non-student READERS or AIDES? Yes \_\_\_ NO \_\_\_

23. If the answer to #22 is Yes, how much total time, in minutes per week, do AIDES or READERS give you volunteer help? \_\_\_\_\_ minutes per week

24. How many minutes per week, for the designated class, do you estimate that an AIDE or READER assists you in the following activities, either for pay or voluntary. (Please answer in either or both columns in each instance, as the case may be.)

Paid AIDE or READER		Volunteer AIDE or READER
_____	a. Supervise bus loading and unloading	_____
_____	b. Assist students before school	_____
_____	c. Supervise lunch, recess and free periods	_____
_____	d. Make routine announcements	_____
_____	e. Process (from parents and/or school secretary and/or teachers) requests for supplies and materials	_____
_____	f. Check attendance	_____
_____	g. Get out and put away instructional materials requested by teacher	_____
_____	h. Handle routine operation of mechanical aides to instruction	_____
_____	i. Collect milk and lunch money	_____
_____	j. Act as "substitute" nurse for minor first aid procedures	_____
_____	k. Operate duplicator	_____
_____	l. Assemble duplicated materials	_____
_____	m. Correct objective tests	_____
_____	n. Inventory supplies and materials	_____
_____	o. Supervise independent study	_____
_____	p. Receive (from school office and/or parents) messages or forgotten items	_____
_____	q. Assist with student weight and measurement records	_____
_____	r. Make entries on pupil progress charts	_____
_____	s. Type and prepare other instructional materials	_____
_____	t. Other (please specify) _____	_____
_____	u. _____	_____
_____	v. _____	_____
_____	TOTAL	TOTAL

Please be sure that the totals of #24 (paid plus volunteer) equals #20.

25. For the class designated in #2, how many visitors or people from the community did you use for:
- \_\_\_\_\_ a. Resource persons
  - \_\_\_\_\_ b. Discussion leaders
  - \_\_\_\_\_ c. Speakers
  - \_\_\_\_\_ d. Presenters
  - \_\_\_\_\_ e. Other (please specify) \_\_\_\_\_

26. On the basis of your responses to the items in this questionnaire, please identify the instructional skills or techniques (considering the class designated in #2) in which you find satisfaction or dissatisfaction. Check in the appropriate box.

	Dissatisfaction			Satisfaction		
	most	more	some	some	more	most
	0	1	2	3	4	5
e. Large Group Instruction						
b. Small Group Instruction						
c. Independent Study and Quest Projects						
d. Team Teaching						
e. Behavioral Objectives						
f. Learning Activities Packages						
g. Auxiliary Personnel						

27. Which phases of the New Design (question #26, a-g) do you do most effectively?
- (1) (3)
- (2) (4)
28. Which phases of the New Design (question #26, a-g) do you enjoy doing most?
- (1) (3)
- (2) (4)
29. Which phases of the New Design (question #26, a-g) do you feel that you need help with?
- (1) (3)
- (2) (4)

30. Which phases of the New Design (question #26, a-g) are other colleagues doing even without training?
- (1) (3)
- (2) (4)
31. Have you attended any workshops, seminars, classes, etc., which also taught the New Design concepts, in addition to the one conducted by Union College? Yes \_\_\_\_\_ No \_\_\_\_\_ Please specify a. \_\_\_\_\_ b. \_\_\_\_\_
32. Approximately how many articles or books have you read which dealt with the New Design concepts included in this questionnaire?
- a. Articles \_\_\_\_\_ b. Books \_\_\_\_\_
33. In what areas do you think you should improve your teaching ability over the next five years?
- a. (What?)
- b. (Why?)
- c. (How?)
34. If you wish a free copy of the summary findings of this study, please place a check in the box below.

Please send a free copy of your findings.



APPENDIX C

Table C.1a. Conventional vs. learning package instruction--a comparison

All Personnel on Philosophy and Attitudes		
Unweighted <sup>†</sup> Mean (X) Achievement Differences (B)		
	<u>Conventional Instruction (a<sub>1</sub>)</u>	<u>Learning Package Instruction (a<sub>2</sub>)</u>
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{3.109}{6.000} = 0.518$	$\frac{3.283}{6.000} = 0.5305$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_2$ (Immediately After Workshop)	-0.140	-0.188
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.064	-0.094
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.104	-0.096

Table C.1a. (Continued)

Analysis of Variance for Unweighted Means				
Source	SS	df	MS	F
Methods (A)	0.0329	1	0.0329	0.31220
Sub. w. gps.	9.2839	88	0.1055	
Test Admin. (B)	0.3580	2	0.1790	11.1032 <sup>**</sup>
AB	0.0427	2	0.0213	1.3016
B x Sub. w. gps.	2.8554	176	0.0162	

<sup>\*\*</sup> p < 0.01

Tabled  $F_{1, 88}$

@ 0.10 = 2.77  
 0.05 = 3.95  
 0.01 = 6.93

$F_{2, 176}$

@ 0.10 = 2.30  
 0.05 = 2.66  
 0.01 = 3.89

(8, 59)

Table C.1b. Conventional vs. learning package instruction--a comparison

Behavioral Objectives		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{7.065}{11} = 0.642$	$\frac{7.152}{11} = 0.650$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	=-.018	+0.016
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	+0.014	+0.020
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	0.000	+0.081

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.1100	1	0.1100	1.4582
Sub. w. gps.	6.6372	88	0.0754	
Test Admins. (B)	0.0786	2	0.0393	2.4481 <sup>#</sup>
AB	0.0664	2	0.0332	2.0675
B x Sub. w. gps.	2.8254	176	0.0161	

<sup>#</sup>P < 0.10.

Table C.1c. Conventional vs. learning package instruction--a comparison

Team Teaching		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible = $\bar{X}$ (Before Workshop)	$\frac{7.935}{14} = 0.567$	$\frac{8.522}{14} = 0.609$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.049	-0.102
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.042	-0.057
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ Six Months After Workshop)	-0.042	-0.038

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0312	1	0.0312	0.5874
Sub. w. gps.	4.6803	88	0.0532	
Test Admin. (B)	0.0599	2	0.0299	2.2241
AB	0.0373	2	0.0186	1.3854
B x Sub. w. gps.	2.3685	176	0.0135	

No significant differences.

Table C.1d. Conventional vs. learning package instruction--a comparison

Large Group Instruction		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{5.4565}{11} = 0.496$	$\frac{5.7174}{11} = 0.520$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.291	-0.273
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.091	-0.109
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.304	-0.273

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0076	1	0.0076	0.0872
Sub. w. gps.	7.6586	88	0.0870	
Test Admin. (B)	2.0614	2	1.0307	83.9097 <sup>**</sup>
AB	0.0289	2	0.0245	1.1765
B x Sub. w. gps.	2.1618	176	0.0123	

<sup>\*\*</sup> P < 0.01.

Table C.1e. Conventional vs. learning package instruction--a comparison

Small Group Discussion		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{7.0435}{11} = 0.640$	$\frac{7.4130}{11} = 0.674$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.025	-0.004
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.126	-0.059
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.006	+0.038

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.1302	1	0.1302	1.6988
Sub. w. gps.	6.7469	88	0.0767	
Test Admins. (B)	0.5667	2	0.2833	18.5428 <sup>**</sup>
AB	0.0234	2	0.0117	0.7641
B x Sub. w. gps.	2.5896	176	0.0153	

<sup>\*\*</sup> P < 0.01.

Table C.1f. Conventional vs. learning package instruction--a comparison

Independent Study		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop)	$\frac{8.2174}{13} = 0.632$	$\frac{8.9783}{13} = 0.691$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After <sup>1</sup> Workshop)	-0.178	-0.167
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.077	-0.022
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After <sup>3</sup> Workshop)	-0.182	-0.147

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0769	1	0.0769	1.4604
Sub. w. gps.	4.6314	88	0.5263	
Test Admins. (B)	0.8574	2	0.4287	38.8400 <sup>**</sup>
AB	0.0219	2	0.0110	0.9927
B x Sub. w. gps.	1.9426	176	0.0110	

<sup>\*\*</sup> P < 0.01.



Table C.1g. Conventional vs. learning package instruction--a comparison

Auxiliary Personnel		
Unweighted <sup>†</sup> Mean (X) Achievement Differences (B)		
	Conventional Instruction (a <sub>1</sub> )	Learning Package Instruction (a <sub>2</sub> )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{10.1739}{13} = 0.7826$	$\frac{10.0652}{13} = 0.7742$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	+0.006	-0.056
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.058	-0.060
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	+0.006	-0.008

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0454	1	0.0454	0.7760
Sub. w. gps.	5.1436	88	0.0584	
Test Admin. (B)	0.1505	2	0.0752	6.5507 <sup>**</sup>
AB	0.0438	2	0.0219	1.9066
B x Sub. w. gps.	2.0216	176	0.0115	

<sup>\*\*</sup> P < 0.01.

Table C.1h. Conventional vs. learning package instruction--a comparison

Learning Activity Packages		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{6.6739}{11} = 0.6067$	$\frac{6.6739}{11} = 0.6067$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.188	-0.206
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.037	-0.053
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.208	-0.189

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0018	1	0.0018	0.0221
Sub. w. gps.	7.0406	88	0.0800	
Test Admin. (B)	1.3958	2	0.6979	43.0183 <sup>**</sup>
AB	0.0202	2	0.0201	0.6233
B x Sub. w. gps.	2.8554	176	0.0162	

<sup>\*\*</sup> P < 0.01.

Table C.2a. Conventional vs. learning package instruction--a comparison

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All Personnel on Philosophy and Attitudes

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_1$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.086*	0.067**
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$			0.019
<hr/>			
	S.10 = 0.0407 <sup>#</sup>	S.05 = 0.0437*	S.01 = 0.0529**

All Personnel on Behavioral Objectives

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_2$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.018	0.042 <sup>#</sup>
Six Weeks After Workshop = $b_2$			0.024
Six Months After Workshop = $b_3$			
<hr/>			
	S.10 = 0.0406 <sup>#</sup>	S.05 = 0.0436*	S.01 = 0.0527**
			(8)

No significant differences were found on Team Teaching.

Table C.2b. Conventional vs. learning package instruction--a comparison

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All Personnel on Large Group Instruction

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_1$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.1818**	
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$		0.1880**	

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S.10 = 0.0355 <sup>#</sup>	S.05 = 0.0381 <sup>*</sup>	S.01 = 0.0461 <sup>**</sup>
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Table C.2c. Conventional vs. learning package instruction--a comparison

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All Personnel on Small Group Instruction

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_1$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$			0.0308
Six Weeks After Workshop = $b_2$	0.0512*		0.1083**
Six Months After Workshop = $b_3$			

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S.10 = 0.0396 <sup>#</sup>	S.05 = 0.0425*	S.01 = 0.0514**	(8)
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All Personnel on Independent Study

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_2$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.1235**	0.0083
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$		0.1152**	

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S.10 = 0.0334 <sup>#</sup>	S.05 = 0.0360*	S.01 = 0.0435**	(8)
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Table C.2d. Conventional vs. learning package instruction--a comparison

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All Personnel on Auxiliary Personnel

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_1$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop - $b_1$			
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$			
<div style="display: flex; justify-content: space-around;"> <span><math>s_{.10} = 0.0343^{\#}</math></span> <span><math>s_{.05} = 0.0369^*</math></span> <span><math>s_{.01} = 0.0446^{**}</math></span> </div> <div style="text-align: right; margin-top: 5px;">(8)</div>			

All Personnel on Learning Activity Packages

Scheffé's Tests of Unweighted Means  
Comparing  $b_1$  with  $b_2$  with  $b_3$  at  $a_2$

	<u><math>b_1</math></u>	<u><math>b_2</math></u>	<u><math>b_3</math></u>
Immediately After Workshop = $b_1$		0.1520 <sup>**</sup>	
Six Weeks After Workshop = $b_2$			
Six Months After Workshop = $b_3$	0.0011	0.1531 <sup>**</sup>	
<div style="display: flex; justify-content: space-around;"> <span><math>s_{.10} = 0.0407^{\#}</math></span> <span><math>s_{.05} = 0.0437^*</math></span> <span><math>s_{.01} = 0.0529^{**}</math></span> </div> <div style="text-align: right; margin-top: 5px;">(8)</div>			

Table C.3a. Conventional vs. learning package instruction--a comparison

In-Service Personnel on Philosophy and Attitudes		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{3.370}{6} = 0.562$	$\frac{3.240}{6} = 0.446$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.100	-0.213
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	0.000	-0.087
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.047	-0.000

Analysis of Variance for Unweighted Means

Source	SS	df	MS	F <sup>††</sup>
Methods (A)	0.3037	1	0.3037	0.3155
Sub w. gps.	5.2467	48	0.0109	
Test Admin. (B)	0.3323	2	0.0166	21.8299 <sup>**</sup>
AB	0.0119	2	0.0060	3.3111 <sup>*</sup>
B x Sub. w. gps.	1.5261	96	0.0159	

\*\* p < 0.01

†† Tabled F<sub>1,48</sub> @ 0.10 = 2.82  
0.05 = 4.04  
0.01 = 7.19

\* p < 0.05

†† F<sub>2,96</sub> @ 0.10 = 2.37  
0.05 = 3.10  
0.01 = 4.83

Table C.3b. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Behavioral Objectives		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{7.1111}{11} = 0.646$	$\frac{7.320}{11} = 0.665$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.064	+0.011
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.004	+0.044
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.024	+0.087

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.2250	1	0.2250	2.4493
Sub. w. gps.	4.4088	48	0.0919	
Test Admin. (B)	0.0946	2	0.0473	2.4276
AB	0.0252	2	0.0126	0.6443
B x Sub. w. gps.	1.8700	96	0.0195	

No significant differences.



Table C.3c. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Team Teaching		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{7.777}{14} = 0.556$	$\frac{8.080}{14} = 0.577$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.040	-0.149
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.046	-0.069
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.074	-0.091

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0920	1	0.0920	2.1190
Sub. w. gps.	2.0834	48	0.0434	
Test Admin. (B)	0.0363	2	0.0181	1.1632
AB	0.0666	2	0.0333	2.1365
B x Sub. w. gps.	1.4960	96	0.0156	

No significant differences.

Table C.3d. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Large Group Instruction		
Unweighted <sup>†</sup> Mean Achievement Differences (B)		
	Conventional Instruction (a <sub>1</sub> )	Learning Package Instruction (a <sub>2</sub> )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{5.778}{11} = 0.525$	$\frac{6.160}{11} = 0.560$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.269	-0.258
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.058	-0.055
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.269	-0.225

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0141	1	0.0141	0.1645
Sub. w. gps.	4.1157	48	0.0857	
Test Admin. (B)	1.3279	2	0.6640	53.0896 <sup>**</sup>
AB	0.1139	2	0.0057	0.4534
B.x Sub. w. gps.	1.2006	96	0.0125	

<sup>\*\*</sup> P < 0.01.

Table C.3e. Conventional vs. learning package instruction--a comparison

In-Service Personnel on Small Group Instruction				
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)				
	Conventional Instruction ( $a_1$ )		Learning Package Instruction ( $a_2$ )	
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{7.296}{11} = 0.663$		$\frac{7.680}{11} = 0.698$	
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.022		-0.022	
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.095		-0.040	
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.012		+0.008	
Analysis of Variance for Unweighted Means				
Source	SS	df	MS	F
Methods (A)	0.0235	1	0.0235	0.4229
Sub. w. gps.	2.6707	48	0.0556	
Test Admin. (B)	0.1119	2	0.0560	3.6142 <sup>**</sup>
AB	0.0188	2	0.0094	0.6073
B x Sub. w. gps.	1.4868	96	0.0155	

<sup>\*\*</sup> P < 0.01.

Table C.3f. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Independent Study				
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)				
	Conventional Instruction ( $a_1$ )		Learning Package Instruction ( $a_2$ )	
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{8.593}{13} = 0.661$		$\frac{9.160}{13} = 0.704$	
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.156		-0.175	
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.037		-0.003	
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.166		-0.150	
Analysis of Variance for Unweighted Means				
Source	SS	df	MS	F
Methods (A)	0.0039	1	0.0039	0.0687
Sub. w. gps.	2.7060	48	0.0564	
Test Admin. (B)	0.6717	2	0.3359	31.5563**
AB	0.0188	2	0.0094	0.8874
B x Sub. w. gps.	1.0217	96	0.0106	

\*\* P < 0.01.

Table C.3g. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Auxiliary Personnel		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{10.370}{13} = 0.851$	$\frac{10.200}{13} = 0.784$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	+0.002	-0.066
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.031	-0.058
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	+0.006	+0.003

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0411	1	0.0411	0.6911
Sub. w. gps.	2.8537	48	0.0595	
Test Admin. (B)	0.0646	2	0.0323	2.8498 <sup>#</sup>
AB	0.0273	2	0.0137	1.2051
B x Sub. w. gps.	1.0884	96	0.0113	

<sup>#</sup>P < 0.10.

Table C.3h. Conventional vs. learning package instruction--a comparison

In-Service Personnel On Learning Activity Package		
Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
$\frac{\text{Pre-Test } \bar{X} \text{ Raw Mean}}{\text{Pre-Test Possible}}$ (Before Workshop)	$\frac{7.222}{11} = 0.656$	$\frac{6.920}{11} = 0.629$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.118	-0.207
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.018	-0.069
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.158	-0.175

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.1028	1	0.1028	1.0589
Sub. w. gps.	4.6609	48	0.0971	
Test Admin. (B)	0.4862	2	0.2431	14.3489 <sup>**</sup>
AB	0.0324	2	0.0162	0.9575
B x Sub. w. gps.	1.6265	96	0.0169	

<sup>\*\*</sup> P < 0.01.

Table C.4a. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Philosophy and Attitudes Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop)	$\frac{2.737}{6} = 0.456$	$\frac{3.333}{6} = 0.555$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.193	-0.159
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.149	-0.103
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.180	-0.063

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F <sup>††</sup>
Methods (A)	0.1284	1	0.1284	1.3948
Sub. w. gps.	3.4988	38	0.0921	
Test Admin. (B)	0.0722	2	0.0361	2.1543
AB	0.0393	2	0.0197	1.1735
B x Sub. w. gps.	1.2735	76	0.0168	

No significant difference.

$$\begin{aligned}
 {}^{††}F_{1, 38} @ 0.10 &= 2.95 \\
 &0.05 = 4.10 \\
 &0.01 = 7.35
 \end{aligned}$$

$$\begin{aligned}
 {}^{††}F_{2, 76} @ 0.10 &= 2.37 \\
 &0.05 = 3.10 \\
 &0.01 = 4.83 \\
 &(8, p. 59)
 \end{aligned}$$

Table C.4b. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Behavioral Objectives Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop)	$\frac{7.000}{11} = 0.636$	$\frac{5.840}{11} = 0.530$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	+0.042	+0.023
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	+0.038	-0.009
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	+0.031	+0.075

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0016	1	0.0016	0.0302
Sub. w. gps.	2.0703	38	0.0545	
Test Admin. (B)	0.0292	2	0.0146	1.2227
AB	0.0431	2	0.0216	1.8060
B x Sub. w. gps.	0.9069	76	0.0119	

No significant difference.



Table C.4c. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Team Teaching Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{8.158}{14} = 0.582$	$\frac{9.048}{14} = 0.646$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.061	-0.046
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.038	-0.044
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	0.000	+0.024

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0034	1	0.0034	0.0554
Sub. w. gps.	2.3619	38	0.0622	
Test Admin. (B)	0.0953	2	0.0477	4.7200*
AB	0.0049	2	0.0024	0.2425
B x Sub. w. gps.	0.7673	76	0.0101	

\* $P < 0.5$ .

Table C.4d. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel On Large Group Instruction Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{5.000}{11} =$	$\frac{5.190}{11} =$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.321	-0.290
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.134	-0.173
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.349	-0.329

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0005	1	0.0005	0.0055
Sub. w. gps.	3.1427	38	0.0827	
Test Admin. (B)	0.7795	2	0.3898	32.6649 <sup>**</sup>
AB	0.0283	2	0.0141	1.1843
B x Sub. w. gps.	0.9068	76	0.0119	

<sup>\*\*</sup> P < 0.01.

Table C.4e. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Small Group Instruction Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{6.6842}{11} =$	$\frac{7.095}{11} =$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.028	+0.018
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.167	-0.082
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	+0.002	+0.074

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.1367	1	0.1367	1.2838
Sub. w. gps.	4.0461	38	0.1065	
Test Admin. (B)	0.5681	2	0.2840	19.8851**
AB	0.0077	2	0.0039	0.2706
B x Sub. w. gps.	1.0856	76	0.0143	

\*\*  $P < 0.01$ .

Table C.4f. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Independent Study Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{7.684}{13} = 0.591$	$\frac{8.762}{13} = 0.674$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.208	-0.157
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.130	-0.044
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.203	-0.144

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.1269	1	0.1269	2.6707
Sub. w. gps.	1.8054	38	0.0475	
Test Admin. (B)	0.0224	2	0.1118	9.6479**
AB	0.0066	2	0.0033	0.2852
B x Sub. w. gps.	0.8807	76	0.0116	

\*\* P &lt; 0.01.

Table C.4g. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Auxiliary Personnel Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
Pre-Test <sup>†</sup> Raw Mean Pre-Test Possible (Before Workshop) = $\bar{X}$	$\frac{9.895}{13} = 0.761$	$\frac{9.905}{13} = 0.761$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	+0.010	-0.043
Pre-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.093	-0.062
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	+0.005	-0.022

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0080	1	0.0080	0.1341
Sub. w. gps.	2.2788	38	0.0600	
Test Admin. (B)	0.1146	2	0.0573	4.9003**
AB	0.0369	2	0.0184	1.5766
B x Sub. w. gps.	0.8888	76	0.0117	

\*\* P &lt; 0.01.

Table C.4h. Conventional vs. learning package instruction--a comparison

Pre-Service Personnel on Learning Activity Packages Unweighted <sup>†</sup> Mean ( $\bar{X}$ ) Achievement Differences (B)		
	Conventional Instruction ( $a_1$ )	Learning Package Instruction ( $a_2$ )
$\frac{\text{Pre-Test}^\dagger \text{ Raw Mean}}{\text{Pre-Test Possible}} = \bar{X}$ (Before Workshop)	$\frac{5.895}{11} = 0.535$	$\frac{6.381}{11} = 0.580$
Pre-Test $\bar{X}$ minus Post-Test #1 $\bar{X} = b_1$ (Immediately After Workshop)	-0.280	-0.206
Post-Test $\bar{X}$ minus Post-Test #2 $\bar{X} = b_2$ (Six Weeks After Workshop)	-0.062	-0.035
Pre-Test $\bar{X}$ minus Post-Test #3 $\bar{X} = b_3$ (Six Months After Workshop)	-0.275	-0.206

## Analysis of Variance for Unweighted Means

Source	SS	df	MS	F
Methods (A)	0.0971	1	0.0971	1.8403
Sub. w. gps.	2.0043	38	0.0527	
Test Admin. (B)	0.9913	2	0.4957	33.5938 <sup>**</sup>
AB	0.0131	2	0.0065	0.4397
B x Sub. w. gps.	1.1280	76	0.0148	

<sup>\*\*</sup>P < 0.01.