THE EFFECT OF SYSTEMATIC COURSE EVALUATION BY STUDENTS AND SYSTEMATIC TWO WAY TEACHER-STUDENT FEEDBACK ON ATTITUDES TOWARD INSTRUCTIONAL TECHNOLOGY AND ON COGNITIVE PERFORMANCE IN INSTRUCTIONAL TECHNOLOGY INSTRUCTION

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY
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This is to certify that the

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THE EFFECT OF SYSTEMATIC COURSE EVALUATION BY STUDENTS AND SYSTEMATIC TWO WAY TEACHER-STUDENT FEEDBACK ON ATTITUDES TOWARD INSTRUCTIONAL TECHNOLOGY ANI ON COGNITIVE PERFORMANCE IN INSTRUCTIONAL TECHNOLOGY INSTRUCTION
presented by

Jay Cleveland Smith

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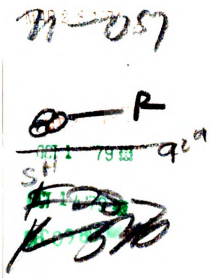

ABSTRACT

THE EFFECT OF SYSTEMATIC COURSE EVALUATION BY STUDENTS AND SYSTEMATIC TWO WAY TEACHER-STUDENT FEEDBACK ON ATTITUDES TOWARD INSTRUCTIONAL TECHNOLOGY AND ON COGNITIVE PERFORMANCE IN INSTRUCTIONAL TECHNOLOGY INSTRUCTION

By

Jay Cleveland Smith

Purposes

The study had two purposes: One purpose was to determine the effect of student course evaluation on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology. A second purpose was to determine the effect of systematic two-way feedback on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology.

Summary

Three sections of Teacher Education 548: Audiovisual Media were offered during the summer, 1970 at Western Michigan University. Each of the sections was randomly assigned to one of three research treatments. Treatment A was a replication of procedures for course evaluation

utilizing student opinions and value judgments developed by Simth[1] and detailed in Chapter II of the study. Treatment B was application of the same procedures with modifications involving systematic two-way (student teacher) feedback. Treatment C was a control. Subjects in each treatment group were given, pre and post treatment, the New Educational Media Attitude (NEMA) inventory and an instructor written cognitive test, A Test for Audiovisual Media. The experimental design used in the study was a Pretest-Posttest Control Group Design.

Four statistical hypotheses were generated and tested:

1_a: When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.

1_b: When given the opportunity to evaluate systematically a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.

2_a: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.

2_b: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.

A one-way multivariate analysis of covariance procedure was used to test Hypotheses 1_a and 1_b for significance at an

alpha level of .05 with appropriate degrees of freedom. A Post-hoc Comparison in Data technique was used to test Hypotheses 2_a and 2_b.

Conclusions

The analysis of the data supports the following conclusions:

1. When given an opportunity for systematic evaluation of a course of instruction, students' cognitive performance in that course is better and their attitude toward the content of the course is more positive than when such evaluation opportunity is not afforded.

2. Although when given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course is not materially affected their attitudes toward the content of that course are significantly more positive then when such feedback opportunity is not afforded.

3. Students' attitude toward the content of a course is more positive when given the opportunity for systematic two-way feedback on that course of instruction than when only given the opportunity for systematic evaluation of the course of instruction without the opportunity for systematic two-way feedback.

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[1]Jay C. Smith, "The Design and Trial of a Course Evaluation System Utilizing Student Opinions and Value Judgments" (unpublished M.Ed. dissertation, University of Hawaii, 1969).

THE EFFECT OF SYSTEMATIC COURSE EVALUATION BY STUDENTS AND SYSTEMATIC TWO WAY TEACHER-STUDENT FEEDBACK ON ATTITUDES TOWARD INSTRUCTIONAL TECHNOLOGY AND ON COGNITIVE PERFORMANCE IN INSTRUCTIONAL TECHNOLOGY INSTRUCTION

By

Jay Cleveland Smith

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The research has been done. The paper has been written and the orals have been passed. The University regulations state that when this dissertation has been typed, duplicated and bound, and my fees have been payed, I will be a "Ph.D." I"m not sure I know what that means. I think it means that, in the judgment of my Committee and the University, I should be able to demonstrate the attributes of a Ph.D.

For over ten years I have associated with and observed Ph.Ds at work. From my observations and associations, I've formulated a concept of what I believe to be the desirable attributes of a Ph.D. These attributes include a quite but apparent competence in an area, an ability to identify and solve a problem, incisiveness, a respect for colleagues, "professionalism," and a personal confidence that permeates all activities.

This dissertation has been the catalyst which has given me the opportunity to learn from those individuals with whom I have worked. From each of them I have been able to observe combinations of attributes I hope to emulate. Each of them, in my experience, has impressed

me with special qualities. As my acknowledgements I herein thank each of them and will, very frankly, copy from each of them.

My committee has been invaluable to me: From Dr. Hideya Kumata I have observed (and hope to copy) a probing and gnawing incisiveness that characterizes a quick mind.--From Dr. Lawrence W. Lezotte I have observed (and hope to copy) an ability to systematically identify and solve a problem using planned research as a tool. In a very meaningful way, Dr. Lezotte has taught me, by example and on a one-to-one basis, the value of disciplined research techniques.--From Dr. Paul W. F. Witt I have observed (and hope to copy) "professionalism" of the highest order. From working with Dr. Witt I have come to know, I think, what it means to be part of a "community of scholars." From him I have also learned the importance of professional and personal integrity.--From my Committee Chairman, Dr. Charles F. Schuller I have observed (and hope to copy) an ability to get a job done: No foolishness. No alibis. No prostitution of standards. Identify a task and accomplish it!

It has not been difficult for me to develop a respect for my colleagues. Without the help of one of them, David W. Hessler, the dissertation could not have been completed. It takes a rare individual to submit his work to microscopic examination. When that same person not only submits his

work for examination but also alters his procedures, spends an inordinate amount of time working with you, and demonstrates a high and sincere ebullience for what you are trying to do, you know you have found not only a professional colleague but also a good friend. Dave Hessler is that rare individual and I am indeed fortunate he is my friend.

My fellow graduate students in Instructional Development and Technology have endured my moods and have constructively criticized my ideas and my work. The associations I have had with them have been a valuable co-curricular component of my program.

I think I know the source of my desired Ph.D. attribute of personal confidence. It comes from the faith and support of loved ones. From the very beginning, my mother and father have encouraged and supported me. My wife, Peggy, gave up a comfortable and secure life when she insisted that I return to school. In innumerable ways she has demonstrated her faith in <u>our</u> goal. My children, Gregory and Cherylle, have not always understood what I was doing. They did know it was right because I was doing it. It is difficult not to be personally confident with the faith and support of a family as loyal as mine.

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CHAPTER I

RATIONALE FOR THE INVESTIGATION

Purpose

One purpose of this study was to determine the effect of student course evaluation on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology. A second purpose of the study is to determine the effect of systematic two-way (student-to-teacher and teacher-to-student) feedback on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in Instructional Technology.

Need for The Study

It has become increasingly apparent over the last few years that technology can improve instruction and should be an integral part of classroom instruction. The evidence has become so strong, in fact, that educators can no longer afford to overlook it. The Presidentially appointed Commission on Instructional Technology reported " . . . that technology properly employed could make education more productive, individual, and powerful, learning more immediate, instruction more scientifically based, and access to

education more equal."[1] The conclusion of the Commission was that this nation " . . . should make a far greater investment in instructional technology. We (the Commission) believe that such an investment will contribute to extending the scope and upgrading the quality of education, and that the results will benefit individuals and society."[2]

Even though there is both need and support for the use of technology in education, its actual use is minimal. In the Commission's report it is estimated that there are fifty million pupils attending class an average of five hours a day, five days a week or 1,250,000,000 pupil class hours a week, yet:

> All the films, filmstrips, records, programmed texts, television and computer programs do not fill more than 5 per cent of these class hours. Some experts put the figure at 1 per cent or less. . . . To generalize and oversimplify: the present status of instructional in American education is low in both quantity and quality.[3]

While it may be true that many teachers are still unaware of the potentials of technology for education, Lois V. Edinger, Professor of Education at the University of North Carolina and a recent past president of the National Education Association, reports that the "vast majority" of the teaching profession are aware of and

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[1]Commission on Instructional Technology, To Improve Learning (Washington, D.C.: Government Printing Office, March, 1971), p. 34.

[2]Ibid., p. 34.

[3]Ibid., p. 21 (Underlining is by the Commission).

have accepted the value of technology in education, "albeit with varying degrees of pleasure and readiness."[4]

If many teachers are aware of the value of technology, why do so few teachers use technology? One of the main barriers to use of instructional technology appears to be attitudinal. In a 1963 study, Tobias found that teachers reacted more negatively to terms which connotate automation, even if the terms all refer to the same thing.[5] Teachers tend to feel threatened by technology, one indication of which is the expressed concern that technology may "dehumanize" education.[6] Other factors preventing the widespread use of technology include lack of adequate or accessible equipment, lack of skill with equipment, and lack of administrative commitment.[7] A final barrier, identified by the Commission, to the widespread use of

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[4] Ibid., p. 55.

[5] Sigmund Tobias, "Lack of Knowledge and Fear of Automation as Factors in Teachers' Attitude Toward Programmed Instruction and Other Media," Audiovisual Communication Review, V14:99-109 (1966), p. 99.

[6] Perhaps one of the most noteworthy discussions of the "dehumanizing" argument relative to technology is the 1959 volume, Human Nature and the Human Condition by Joseph Wood Krutch (Random House), and the counter-argument by the late James D. Finn, "The Tradition in the Iron Mask," Audio-Visual Instruction, June, 1961.

[7] Commission on Instructional Technology, op. cit., Appendix B: passim.

technology in education is that "teachers (are) not trained in Instructional Technology."[8]

> Where there are good (media) programs, and access to them is well-organized, the use of materials is often minimal because teachers are inadequately trained to exploit what is available.[9]

Accordingly, in light of the evidence that teachers are often not adequately trained in instructional technology, on the one hand, and the evident importance of positive teacher attitudes toward instructional technology, on the other, it was determined to investigate the relationship of student course evaluation and cognitive performance in instructional technology education and attitudes toward instructional technology.

Hypotheses

The study was designed to test the following hypotheses:

Effect of Student Course Evaluation

1. When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will be greater than without that opportunity.

2. When given the opportunity to evaluate systematically a course of instruction, students level of attitude

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[8] Ibid., p. 83.

[9] Ibid., p. 83.

toward the content of the course will be more positive than without that opportunity.

Effect of Systematic Two-Way Feedback

3. When given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course will be greater than without that opportunity.

4. When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will be more positive than without that opportunity.

Theory

In a 1957 analysis of how to determine the effectiveness of teachers and to predict the degree of success a potential teacher will achieve in a classroom, Harold E. Mitzel, Assistant Dean for Research, Pennsylvania State University and an experienced researcher of teacher effectiveness, decided that four major variables were involved in teacher effectiveness. To bring the four variables and their interrelationships into clear focus, he constructed a paradigm[10] (see Figure 1). The following is his explanation of the paradigm.

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[10]Harold E. Mitzel, "A Behavioral Approach to the Assessment of Teacher Effectiveness" (New York: Office of Research and Evaluation, Division of Teacher Education), p. 5. (Mimeographed.)

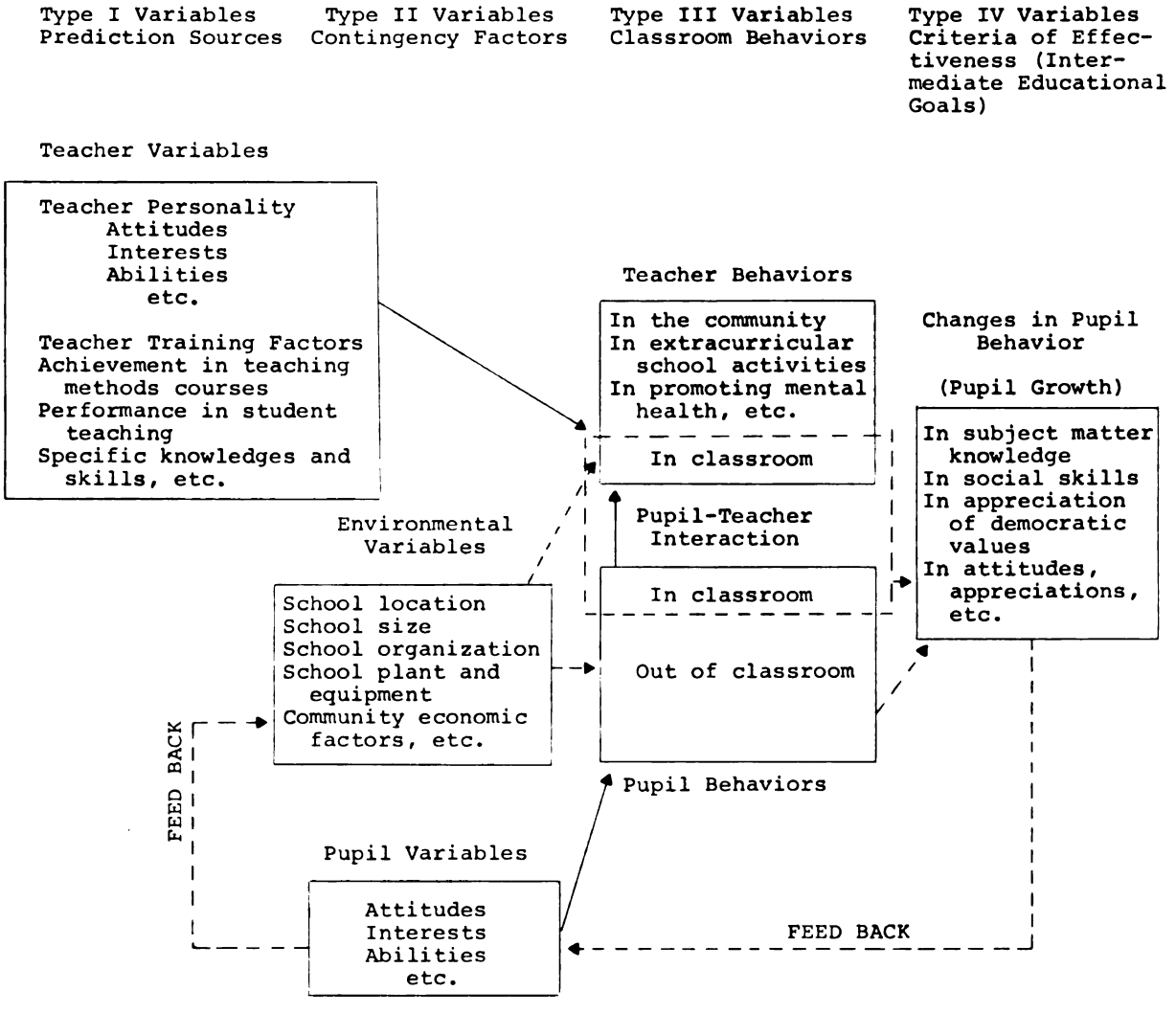

Figure 1: Generalized Schema for Research in Teacher Effectiveness (Mitzel).

> Type I variables are composed of an almost inexhaustible number of human characteristics (personality and training factors) on which teachers differ and which can be hypothesized to account, in part, for differences in teacher effectiveness. Ideally some Type I variables ought to be estimated before young people begin training as teachers, others by their very nature must be deferred until training is underway or completed.
>
> Type II variables are contingency factors (school environment and pupil variables) which modify and influence the whole complex of behaviors that enter into the educational process. If Type II variables play a commanding role in the achievement of educational objectives, then we will be required to replicate studies of teacher effectiveness in a great many different situations, and predictions of teacher success from Type I variables will have to be contingent upon Type II variables.
>
> Type III variables, or behaviors (teacher-pupil behavior) are of crucial significance in the process of assessing effective teaching. The classroom provides the focal point wherein the personality and training of the teacher are translated into actions. Likewise school and background influences on pupils determine in part pupils' classroom behavior. It is primarily out of the interaction of these elements that we expect educational goals to be attained. Considering that classroom behaviors bear such heavy responsibilities in determining educational outcomes, remarkably little is known about them or their effects.[11]
>
> Type IV variables (pupil growth) are the criteria or standards against which the whole of educational effort must be judged. We have subtitled them intermediate educational goals, meaning measurable outcomes at the end of a period of instruction to distinguish them from the ultimate criterion which might be phrased as 'a better world in which to live.'[12]

The interrelationships among the four types of variables are indicated by connecting lines on Figure 1.

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[11] Underlining added.

[12] Mitzel, op. cit., p. 6.

> In general, solid lines are indicative of direct effects and dotted lines suggest indirect or tangential effects. In such a scheme teacher variables (Type I) and pupil variables (Type II) are direct determinants of teacher behavior and pupil behavior respectively. Environmental variables (Type II) indirectly influence both teacher and pupil behaviors. In the view presented here the complex of pupil-teacher interactions in the classroom is the primary source to which one must look to account for pupil growth.[13]

This study is generally concerned with Type III Variables (Classroom Behaviors) identified by Mitzel and specifically concerned with that part of the paradigm bordered by dotted lines and labeled "Pupil-teacher interaction" (see Figure 2).

Mitzel further indicated that his conceptual assesment scheme of teacher effectiveness rested upon at least two fundamental assumptions:

> First, there must be some stability in human personality which exerts a consistent governing or modifying effect on a teacher's behavior in the classroom . . .
> . . . . . .
> The second assumption is that the teacher (or more precisely, the teacher's behavior) as contrasted with the home, the school equipment, the principal, or other factors, is the primary causative factor in accounting for pupil growth toward the goals of the school.[14]

In part to define personality "stability" with reference to teacher behavior, Ryans attempted to build a "theory of teacher behavior."[15] His basic contention is

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[13] Ibid., p. 6.

[14] Ibid., p. 7.

[15] David G. Ryans, Characteristics of Teachers (Washington, D.C.: American Council on Education, 1960), pp. 13-26.

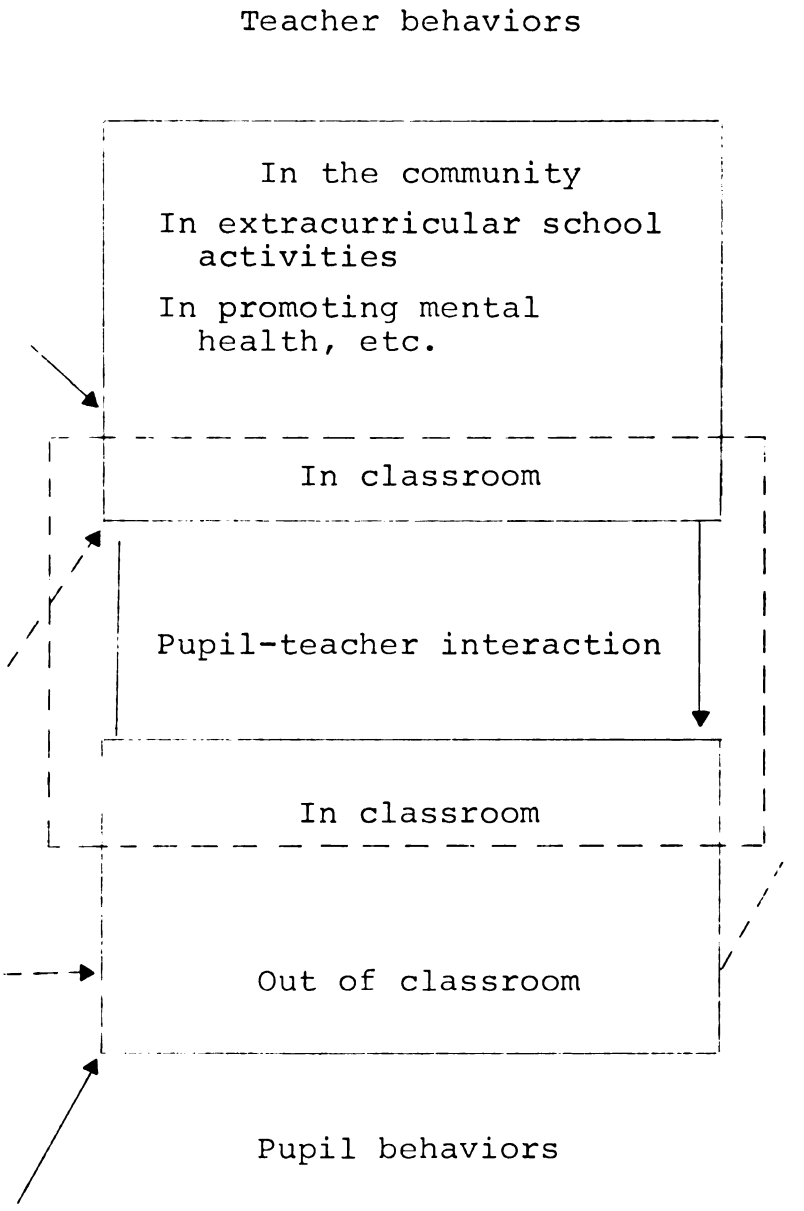

Figure 2.--Type III Variables.

"the behavior of the teacher that ought to be studied is social behavior."[16] He further states that his proposals:

> . . . do not constitute a complete inventory of all assumptions required for a theory of teacher behavior. Nor is any particular claim made at this point for theoretical rigor. But if in the area of teacher behavior there are advantages in resolving and systematizing our thinking, a starting point is necessary regardless of how tentative it may be.[17]

To develop his "systematic theory," Ryans defined the term teacher behavior as:

> . . . the behavior, or activities, of persons as they go about doing whatever is required of teachers, particularly those activities which are concerned with the guidance or direction of the learning of others.[18]

Ryans stated two major assumptions necessary for a theory of teacher behavior, and listed a number of implications (postulates) relating to each of them. One of his basic assumptions was that "teacher behavior is observable."[19] A postulate formulated by Ryans was that teacher behaviors "are revealed through overt behavior and also by symptoms or correlates of behavior."[20]

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[16] Ibid., p. 13.

[17] Ibid., p. 13.

[18] Ibid., p. 15.

[19] Ibid., p. 19.

[20] Ibid., p. 21.

Taking a cue from both Mitzel and Ryans, Smith in a 1969 study[21] conceptualized a "system for course evaluation utilizing student opinions and value judgments." Smith viewed evaluation of a course in toto, and of teacher behavior in particular, as being made up of at least three integrant parts: (1) those measurements assessing the pupil's behavioral change attributed to the content and/or instructional processes of the course; (2) the assessment made by the instructor of his own instructional performance--be that assessment based on objective or subjective (often intuitive) criteria; and, (3) the assessment made by the student participants of the course.

Measurement of behavioral change has been the focus of numerous studies as indicated by C. Robert Pace in a speech before the American Educational Research Association in 1968:

> The years following World War I have been the years of tests and measurement, of individual differences, and selection and classification--the development of standardized achievement tests, group tests of intelligence, the measurement of interests, ability grouping in the schools, and psychometrics as a special field of knowledge and theory.[22]

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[21]Jay C. Smith, "The Design and Trial of A Course Evaluation System Utilizing Student Opinions and Value Judgments" (unpublished M.Ed. dissertation, University of Hawaii, 1969).

[22]C. Robert Pace, Evaluation Perspectives: '68" Transcript of speech delivered to the American Educational Research Association (AERA) presession (Chicago: February, 1968), p. 4. (Mimeographed.)

The instructor's self-evaluation of his performance, on the other hand, has not been the subject of extensive investigation. The definition of such self-evaluation and the identification of variables relative to that assessment is an enormously complex and difficult task. The work of Ryans has identified this evaluation activity as a component of teacher behavior. However, actual research on it is currently rare.

The third integrant, student evaluation, has often been a catalyst for controversy. Many educators have advocated that a vital and integral part of both course design and the instructional process should be the inputs provided by student evaluation.[23] The basic idea is not new. As indicated in a recent Phi Delta Kappan editorial, the popularity of student evaluation and opinion as a part of educational procedures can be considered contemporary.

> It has taken some of us a long time to absorb the shock of facing a determined, agressive, and articulate generation of students. Now we have begun to recognize the dimensions of the problem and especially the need for continuous candid conversations with the students about problems that matter to them. . . . Obviously

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[23]An examination of contemporary literature adds credence to the above statement. For further examination of this thinking, see, among others: Agony and Promise, ed. by G. Kerry Smith (Washington, D.C.: American Association for Higher Education, 1969); Educational Evaluation: New Roles, New Means, ed. by Herman G. Richey (Chicago: The National Society for the Study of Education, 1969); and, Campus Tensions: Analysis and Recommendations (Report of the Special Committee on Campus Tensions) Sol M. Linowitz, American Council on Education, 1970.

> the real problem is not one of making concessions or of removing threats, but of establishing positive and wholesome patterns of relationships among all the persons involved in the education effort--including students.[24]

The intent of this study is to investigate one possible source of a contribution toward those "positive and wholesome patterns of relationships." Generally, professional educators, desire to make changes and revisions necessary to make their own course meaningful and useful, on the one hand; and, on the other hand, they embrace the philosophy that change for the sake of change or change based on passing pressures is not sound pedagogy. Whatever the underlying causes may be for a lack of adequate positive relationships, it appears worth while to investigate the contribution(s) which certain forms of student evaluation can make either to student-instructor relationships or to student attitudes and cognitive achievement, or both.

Definition of Terms

Several terms used throughout the study are defined as follows:

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[24]"Editoral: Will Campus Restlessness Lead to Improved Education?" Phi Delta Kappan, Acting Editor Donald W. Robinson, V. LII: #2 (October, 1970), p. 557.

Attitude

> Opinion, attitude, belief: These terms do not have fixed meanings in the literature, but in general they refer to a person's preference for one or another side of a controversial matter in the public domain--a political issue, a religious idea, a moral position, an aesthetic teste, a certain practice (such as how to rear children).[25]

This study is concerned with a person's anticipated action; accordingly attitude as used here is specifically defined either as:

> An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.[26]

or:

> An attitude is a mental disposition of the human individual to act for or against a definite object.[27]

Evaluation

To operationalize the term and make it more meaningful for the study, the definition by C. Robert Pace of the purpose and process of evaluation has been used:

> Evaluation is seen as an instrument of reform . . . both an act and a result. The reason for evaluating any present activity or program is to improve it.[28]

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[25]Bernard Berelson and Gary A. Steiner, Human Behavior: An Inventory of Scientific Findings (New York: Harcourt, Brace and World, Inc., 1964), p. 557.

[26]G. W. Allport, "Attitudes," Handbook of Social Psychology, ed. by C. M. Murchison (Worcester, Mass.: Clark University Press, 1935), pp. 798-844.

[27]D. D. Dorba, "The Nature of Attitude," Journal of Social Psychology, V4 (1933), pp. 444-463.

[28]C. Robert Pace, op. cit., p. 3.

and, further,

> We undertake to evaluate a program because we hope thereby to improve it. We know that knowledge of results aids us in learning new skills. So likewise, an evaluation of our status and progress helps us to improve that status and to make further progress. By analyzing our experiences, resources and programs we help to clarify them and to bring our efforts more directly in line with our purposes. Thus evaluation is a technique that can and should lead to the continuous improvement of education.[29]

Feedback

Feedback in this study is defined as "the reaction of some results of a process serving to alter or reinforce the character of that process."[30] Two-Way Feedback is defined as feedback from student to teacher and teacher to student.

Instructional Technology

The terms, instructional technology and educational media are used interchangeably in the study being reported. The definition used is by the Commission on Instructional Technology:

> Instructional technology goes beyond any particular medium or device. In this sense, instructional technology is more than the sum of its parts. It is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human

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[29] Ibid., p. 9.

[30] The Random House Dictionary of the English Language (unabridged edition) (New York: Random House, 1968).

> and nonhuman resources to bring about more effective instruction.[31]

System

The definition of system used in this study is the one by Schuller:

> A 'system' may be defined as any group of dynamically related components which operates in concert or in related fashion for the purpose of achieving a specified goal or set of goals.[32]

Overview

The development and design of the evaluation system central to the study is outlined in detail in Chapter II. Chapter III contains the research design of the study including a discussion of the procedures, instruments and statistical analysis. The results of the experiment and an analysis of the data are reported in Chapter IV. The summary, conclusion, and implications for further research are presented in Chapter V.

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[31] Commission on Instructional Technology, op. cit., p. 5.

[32] Charles F. Schuller, "Systems Approaches in Media and Their Application to Individualized Instruction at the University Level," Michigan State University, 1967, presented in part at Bucknell University Symposium, February, 1968. (Mimeographed.)

CHAPTER II[1]

DEVELOPMENT AND DESIGN OF THE STUDENT COURSE EVALUATION SYSTEM

The present chapter first reviews the two basic components included in the development of a student course evaluation system--namely, the evaluation process as a whole and systems analysis. This is followed by an explanation of the Student Course Evaluation Model design for this study.

Review of Evaluation and Systems Analysis

Student course evaluation is a part of the general process of evaluation.

> Most of us believe that all American boys and girls should have experiences that are maximally meaningful to them at the time, and that their judgments are necessary if we are to know what is meaningful.[2]

In the Theory section of Chapter I, it has been indicated that this study is generally concerned with teacher classroom behaviors and specifically concerned

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[1]This Chapter is a more extensive and updated version of a Chapter of the same title that originally appeared in Jay C. Smith, "The Development and Trial of A Course Evaluation System Utilizing Student Opinion and Value Judgments" (unpublished M.Ed. dissertation, University of Hawaii, 1969).

[2]Stephen M. Corey, "A Perspective on Education Research," The Education Digest, 19:3 (November, 1963).

with pupil-teacher interactions (see Chapter I, Figure 1 and Figure 2). Three integrant parts of a course evaluation process have been identified: (1) those measurements assessing the pupil's behavioral change attributed to the content and/or instructional processes of the course; (2) the assessment made by the instructor of his own instructional performance; and (3) the assessment made by the student participants of the course. In order to establish a foundation for the development of a course evaluation system designed for integrant number three (student course evaluation) a review of the general evaluation process is necessary.

Evaluation as a Factor in Program Development

Phil C. Lange defines evaluation as follows:

> Evaluation is the process of valuing something. It could be directed to the purpose of securing value judgments about the feasibility of a plan, or to the purpose of establishing the value of a plan according to some criteria, or it might appraise the observable outcomes of a program in accordance with the established purpose of that program, or it might be any of a large variety of other ways of valuing good intentions or actual procedures, or evident outcomes.[3]

The salience of evaluation in education today is evident in the spirit of reform and innovation which one feels in many segments of education--new curricula, new

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[3]Phil C. Lange, "Evaluation: On the Process of Evaluation," paper prepared for the Experienced Teacher Fellowship Program, University of Hawaii, May, 1968, p. 1. (Mimeographed.)

technologies, new administrative patterns, and new clientele to be served. A search of the literature yielded much evidence and research pertaining to evaluation en masse. Information relative to the specific topic of student evaluation of courses was limited.

Prior to the 1930's, professional educators were primarily concerned with tests and measurements. The emphasis was on intelligence testing, standardized achievement tests, ability groupings, and psychometrics. As the measurement/evaluation field began to grow in maturity, a shifting concern from the confining limits of measurement to broader aspects of evaluation became evident. As Pace points out, both the scope and function of evaluation was expanded:

> Evaluation accepted and welcomed the use of observations, interviews, check lists, questionnaires, testimony, the minutes of meetings, time logs, and many other relevant means of assembling information. It included psychometrics but held that psychometric theory was irrelevant in many evaluation activities. Evaluation thus freed itself from the arbitrary restrictions of the experimentalist's preoccupation with research design and hypothesis testing. Evaluation became related to group dynamics, action research, self-improvement, and to other 'movements' concerned with the processes of change and betterment. The reason for evaluating any present activity or program was to improve it. . . . Thus the process of carrying out an evaluation was directly related to achieving the purpose of evaluation--namely, the purpose of change and improvement.[4]

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[4]C. Robert Pace, "Evaluation Perspectives: '68," Transcript of speech delivered to the AERA Presession, Chicago, February, 1968, pp. 2-3. (Mimeographed.)

Objectives and Evaluation

Analogous with the development of evaluation as a process of reform, was a developing concern with the specification and use of objectives. Ralph Tyler outlined the process of evaluation as (a) identifying general objectives in behavioral terms; (c) identifying situations in which the behavior could be observed; (d) devising and applying instruments for making the observation; and (e) relating the obtained evidence to the professed objectives.[5] As this process was applied it was evident that the clarity of objectives and the relevance of measures had a direct impact on the clarity and relevance of instruction. Evaluation was thus a way to improve instruction.

David R. Krathwohl when speaking of objectives states:

> A major contribution of this [objectives] approach to curriculum building is that it forces the instructor to spell out his instructional goals in terms of overt behavior. This gives new detail; indeed it yields an operational definition of many previously general and often fuzzy and ill-defined objectives.[6]

The concept of evaluation as intimately related to the objectives of instruction led Benjamin Bloom and others to

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[5]Ralph W. Tyler, "Translating Youth Needs Into the NEEDS of Youth, Part I," Fifty-Second Yearbook of the National Society for the Study of Education (Chicago: University of Chicago Press, 1963), passim.

[6]David R. Krathwohl, "Stating Objectives Appropriately for Program, for Curriculum, and for Instructional Materials Development," Journal of Teacher Education, March, 1965, p. 20.

construct the Taxonomy of Educational Objectives,[7] a taxonomy which is equally relevant for the classification of objectives and the construction of test items.

Viewed both in retrospect and contemporaneously, then, the emphasis is quite clear:

> Why do we evaluate? One very clear reason is in order to judge the effectiveness of an educational program. We undertake to evaluate a program because we hope thereby to improve it. By knowing its strengths and weaknesses we are enabled to plan more intelligently for its improvement. Thus evaluation is a technique that can and should lead to the continuous improvement of education.[8]

Finally, it can be said that evaluation is a cycle which involves clarifying objectives, measuring the attainment of objectives, and adapting teaching methods and materials to facilitate the better attainment of objectives. This cycle of continuous evaluation should be a powerful method for the improvement of curricula, the improvement of instruction, and the improvement of testing.

Evaluation, as Tyler has indicated, is a process. Pace has identified it as a process leading to improved performance. By implication, then, the process of course evaluation should lead to an improved course and, logically, improved instruction of a course. Richard L. Turner, Associate Dean for Research at Indiana University, has recently commented on what "good" teaching means:

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[7]B. S. Bloom, M. D. Englehart, E. J. Furst, W. H. Hill, and D. R. Krathwohl, eds., Taxonomy of Educational Objectives: HandbookI: Cognitive Domain (New York: McKay, 1956).

[8]Pace, op. cit., p. 28.

> Good teaching is judged by its outcomes. There are many possible kinds of outcomes to college teaching: student reports or evaluations, factual knowledge, ability to think in a content area, ability to integrate content areas, one's orientation toward the utility of knowledge, his selection of an occupation, his arousal to militant action, his interpersonal sensitivity, and so on. Such outcomes may be differentially valued. Different criterial weights may be assigned to them. The act of assigning value-weights in a situation is the procedure by which what is meant by 'good' in that situation is determined.[9]

In the same article, Turner emphasizes the need for systematic evaluation of instruction:

> Indeed, if there has been a failure in our efforts to improve teaching, and one suspects there has been, it is because we have neglected to systematically evaluate and painstakingly isolate those variables . . . which hold the key to our successes.[10]

One method of systematizing and studying a process (such as evaluation) is by the application of systems analysis.

SYSTEMS ANALYSIS

System, as defined by Webster's Unabridged Dictionary, is: "a regularly interacting or interdependent group of items forming a unified whole."[11] An analysis of this definition reveals that the key words in the definition are: regularly; interacting or interdependent; and, unified whole.

A review of the extensive literature relating to systems analysis shows that there is no single definition

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[9]Richard L. Turner, "Good Teaching and Its Contexts," Phi Delta Kappan, VLII, No. 3 (November, 1970), p. 155.

[10]Ibid., p. 158.

[11]Webster's Unabridged Dictionary, 1968.

of it. Harry J. Hartley says of systems analysis: "It is fairly apparent that the term, systems analysis, possesses nearly as many definitions as there are persons who advocate its use. It is a prestigious term used by many in a casual fashion."[12] He then goes on to define systems analysis:

> The concept of systems analysis may be defined as an orderly way to identifying and ordering the differentiated components, relationships, processes, and other properties of anything that may be conceived as an integrative whole.[13]

Hall and Fagen define systems simply: "A system is a set of objects together with relationships between the objects and between their attributes."[14] John Pfieffer defines systems analysis as " . . . a disciplined way . . . to analyze as precisely as possible sets of activities whose interrelationships are very complicated, and of formulating comprehensive and flexible plans, on the basis of the analysis."[15] A further definition for consideration may be the one from Kaufman, "The sum total of separate parts working independently, and in interaction to achieve a

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[12]Harry J. Hartley, Educational Planning, Programming, Budgeting: A Systems Approach (Englewood Cliffs: Prentice-Hall, Inc., 1968), p. 24.

[13]Ibid., p. 23.

[14]A. D. Hall and R. E. Fagen, "Definition of System," General Systems, Yearbook of the Society for General Systems Research, Vol. 1 (1956), p. 23.

[15]John Pfeiffer, New Look at Education: Systems Analysis in Our Schools and Colleges (New York City: Odyssey Press, 1968), p. 2.

previously specified objective."[16] Barson and Heinich define systems in the context of instruction as:

> An Instructional System is a complex consisting of the following components: Learner(s) and a combination of instructor(s), materials, machine(s) and technician(s), given certain inputs and designed to carry out a prescribed set of operations. This set of operations is devised and ordered according to the most recent and pertinent evidence from research and expert opinion such that the probability of attaining the output, specified behavioral changes in the components is maximal.[17]

A consensus of definition is that a system is composed of the parts of a whole, working in relationship to accomplish the purposes (or tasks) of the whole.

A further consensus among practitioners of systems analysis is that there are definite limitations to the systems analysis approach. Chief among these limitations, as stated by Pfeiffer, is that "the systems approach is not a set, established thing with clear-cut rules to follow in dealing with all problems."[18] Or by Hartley, " . . . systems analysis should be viewed, not in a narrow

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[16]Roger A. Kaufman, "A Systems Approach to Education: Derivation and Definition," Audio Visual Communication Review, 16: 4 (Washington D.C.: Department of Audiovisual Instruction, 1968), p. 419.

[17]John Barson and R. Heinich, "The Systems Approach to Instruction," Department of Audiovisual Instruction 1966 Convention, San Diego (audiotape) (Boulder: National Tape Repository, University of Colorado). Also reported in part in "The Systems Approach," Audiovisual Instruction, 11 (1966), pp. 431-433.

[18]Pfeiffer, op. cit., p. 3.

context, but in a broad sense as a planning procedure for relating curricular objectives to human and material resources," and, further, "The value of a systems approach is that it formalizes what takes place in the framework of the management decision process at any jurisdictional level."[19]

Insofar as the purpose of this study is concerned, systems analysis can be defined and limited to a framework for an analysis of the working relationships inherent to the task, which are regularly performed to accomplish the purpose--stated or implied--of the task.[20] The systems analysis approach then, at the risk of oversimplification, is a model for the way things are done.

Accepting the definition that systems analysis is a model for the way things are done, a logical question that might be asked is, "Why use a systems analysis approach at all?" According to one practitioner of the art,[21] "Our trade is to help people make decisions." The essential power of the approach is that it offers a solid objective foundation for decisions. Referring once again to Pfeiffer:

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[19]Hartley, op. cit., p. 51.

[20]In the study being reported the "task" is the development of a student course evaluation system.

[21]Special note should be made that systems analysis is generally regarded as an art and not a science. Not once in all the literature reviewed for this study has a formula been found that has labeled itself "this is the way it is to be done."

> Indeed, the systems approach concerns itself above all with the nature of decision making. Intangibles have always played a leading role in the process, and there is no substitute for judgment, the unique contribution of the man shaping major policies. He is always on his own when the chips are down. No one can help him at the moment of decision, when he selects one course of action over another. Before he reaches this state, the systems approach comes in to provide guidlines and evaluations, on the theory that a combination of his judgment and an analysis drawing on the advanced technology of assessment may be more effective than either alone.[22]

Most professional educators concur that learning is a system of interacting variables requiring decision making at several levels (objectives, procedures, materials, evaluation) by several component members of the system (learner, teacher, curriculum designer). Yet too often:

> Too many professional educators view the notion of a systems approach, which has been borrowed from engineering and industry, as harsh and ominous in its implications for the management of instructional processes. But instructional planning in modern educational institutions cannot be conducted on a piecemeal basis without some effort toward a rational and efficient deployment of human and technical resources. Consequently, the use of the systems concept is intellectually and practically inescapable.[23]

In summary, systems analysis provides an intellectual technique for unifying the diverse activities of instruction (and evaluation of instruction) in a logically consistent fashion; and then, using that technique, coupled with other

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[22]Pfeiffer, op. cit., p. 3.

[23]Donald K. Stewart, "A Learning Systems Concept as Applied to Courses in Education and Training," in Educational Media: Theory Into Practice, ed. by R. V. Wiman, and W. C. Meierhenry (Columbus, Ohio: Charles E. Merrill Publishing Co., 1969), p. 137.

educational techniques of problem solving, to answer questions relative to those diverse activities.

Design of the Model for Student Course Evaluation

The Process of Systems

Based on the premise that the systems analysis approach is a logical method of problem solving and that evaluation is a process of valuing leading to reform, the next step is to analyze the relationships of the two (systems analysis and evaluation) and then design a model utilizing pertinent features of both processes.

> Systematic thinking is logical thinking. By expanding the options and reducing uncertainties, the systems analyst increases the probability in his favor. The range of potential application of this concept is nearly unlimited. . . . Its major virtue is the enhancement of human judgment.[24]

The literature relevant to instructional design is filled with models of one sort or another. Without exception, this investigator has been unable to find a single model of an instructional system that did not have as one of its subsystems--direct or implied--the need for evaluation. By the same token, little information has been found pertaining to a systematic way of evaluating, i.e., a systems model for the evaluation subsystem of course design.

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[24]Hartley, op. cit., p. 43.

John Pfeiffer, in his book New Look At Education: Systems Analysis In our Schools and Colleges, a report of a survey sponsored by Educational Testing Service of Princeton, New Jersey, identifies three basic features or elements in a systems approach: (a) Design for Action; (b) Seeking Alternatives; and, (c) Evaluation.[25] He defines element one, Design for Action, as being able to "ask the right questions." He goes on to state that the first task in dealing with problems is to:

> Identify exactly what has to be done, which means defining objectives and--more than that--defining objectives in operational terms, in ways that demand concrete action.[26]

Criteria are than selected which measure how well the objectives are being met and determine when those objectives have been reached.

The second element, Seeking Alternatives, calls for the identification and spelling out of different methods of meeting each objective. "This is an active not a passive step. There must be an organized effort to search out alternatives, perhaps the most important and creative phase of systems analysis."[27] The final element, Evaluation, involves the measurement of the alternatives selected in element two (Seeking Alternatives) and the comparative

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[25]Pfeiffer, op. cit., p. 4.

[26]Ibid., p. 5.

[27]Ibid., p. 5.

benefits of each in light of the operational objectives designated in element one (Design for Action):

> Alternatives are generally evaluated in numerical terms, . . . but qualitative factors are always to be considered along with quantitative factors; there are always political implications, questions of morale, and other effects, which may not be measurable in satisfactory terms.[28]

To facilitate the understanding of a systems process and the three elements of the process outlined by Pfeiffer, an analysis of a representative system which appears relevant to the purpose of the study might prove useful. Figure 3 is a Model of a Systems Approach to Course Design formulated by John Barson and others at Michigan State University. The first level of the system (Innovation, Analysis, and Objectives) is representative of Pfeiffer's Element One, Design for Action. This level requires the asking of questions (Innovation and Analysis) relative to the task at hand. The formulation of objectives and setting of criteria are implied in both steps, Analysis and Objectives. Pfeiffer's Element Two, Seeking Alternatives, is illustrated by the steps: Strategy, Content, Examples, Media Forms, Search, Produce and Implement. This is the action phase of the systems approach. It is also a critical phase of the process which:

> . . . demands open-mindedness and readiness to discard preconceived notions. Furthermore, the alternatives

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[28] Ibid., p. 5.

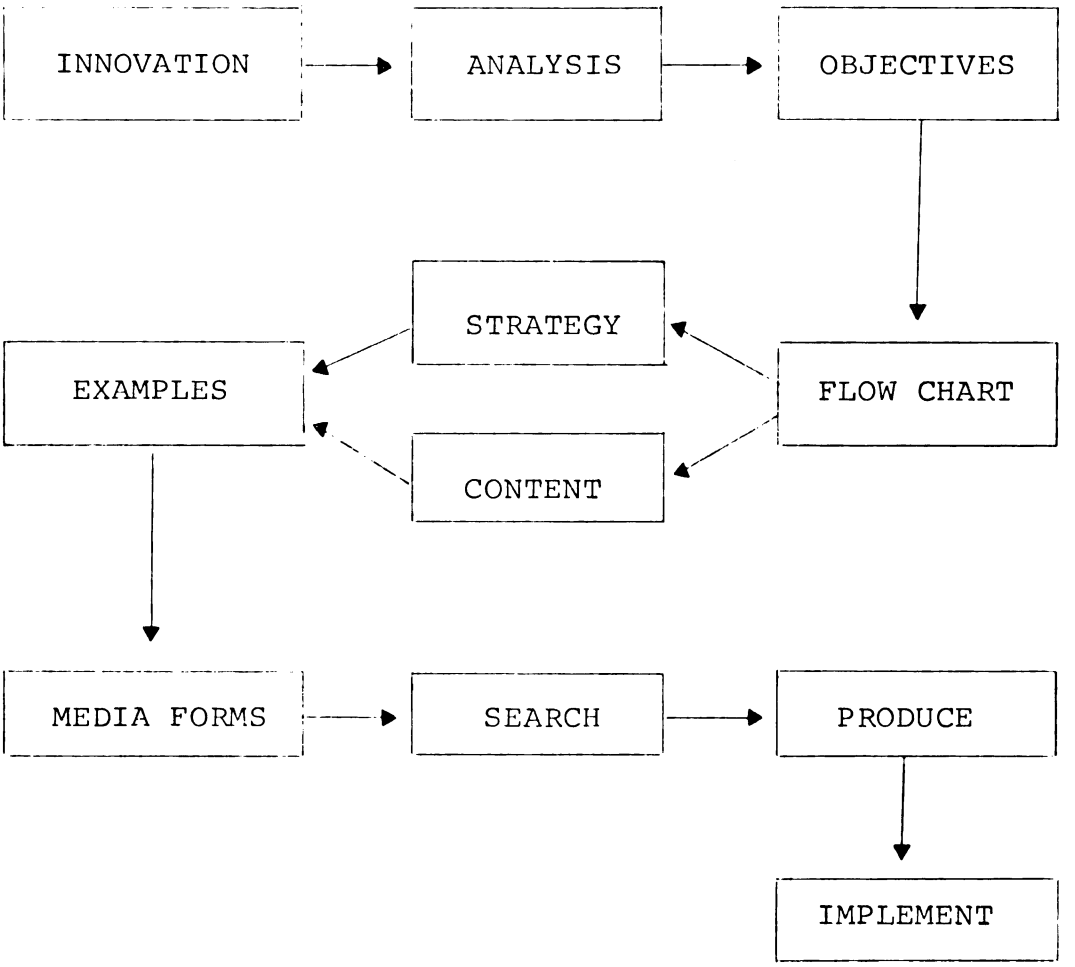

Figure 3.--Systems Approach to Course Design (John Barson, et al., Michigan State University).

> may be combined in different ways and each combination represents a possible plan, a set of activities which may bring about a desired set of changes.[29]

Barson reports that in the system illustrated (see Figure 3), the alternatives revolving around Examples are proving to be crucial and sometimes elusive. Implied by such a report, and indeed, inherent to the system as a whole, is the need for Evaluation, the third Element in Pfeiffer's analysis of the systems approach.

> Finally, evaluation is a repetitive process. A plan must be monitored to check its current effectiveness, modified if necessary, checked again, remodified, and so on.[30]

Figure 4 is the model designed by this investigator to represent the systems analysis approach utilized in this study to evaluate an instructional course by the use of student opinion and value judgments. It should be noted that the model is limited to the concern of this study and, as such, makes no attempt to detail the planning nor the rationale that may have gone into the initial formulation of each component part. This model presupposes that appropriate thought concerning the design of the course had taken place and that the evaluation process would build on prior work. It should be noted, further, that this model is intended as a subsystem within a subsystem. In other words, this model is a systematic approach to

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[29] Ibid., p. 5.

[30] Ibid., p. 6.

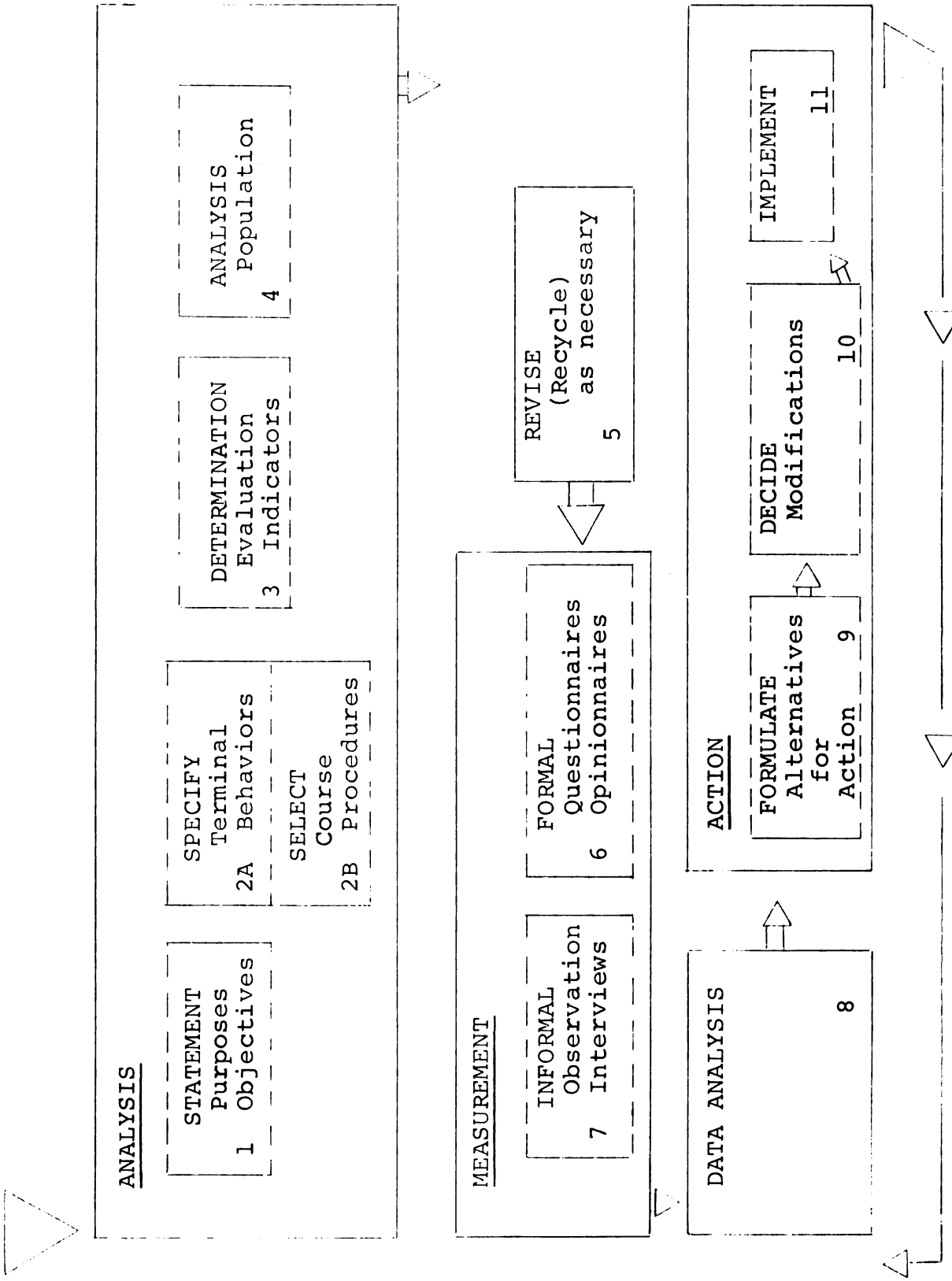

Figure 4: Smith Model for Course Evaluation Utilizing Student Opinion and Value Judgments.

decision making regarding evaluation by students and evaluation is a part (a subsystem) of a larger system (course design).

Explanation of the Model

The System for Student Course Evaluation (illustrated in Figure 4) entails three levels of activity and a number of steps within each level. The three levels of activity are Analysis, Measurement, and Action.

Level One: Analysis.--Level One, Analysis, may be considered as an activity which calls for a synthesis of the aims and purposes of the course, an analysis of the measurability of those aims and purposes, and a delineation of the evaluation indicators that will be used to measure the attainment of the aims, purposes, and the specific student terminal behaviors desired of the course.

With respect to the measurability of the aims and purposes of the course, the instructor would likely want to consider what Pfeiffer calls the "controllable and uncontrollable variables."[31] Uncontrollable variables are constraints on the system and by definition are normally beyond the control of the instructor. An uncontrollable variable is that type of happening, natural or mechanical, relative to the instructional environment over which the instructor has no control. Examples of this

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[31] Ibid., p. 23.

type of uncontrollable variable would be the weather or the mechanical failures of instructional machines. Although these variables play a part in the total outcome of a system, hence are relevant to evaluation, they are usually beyond the control of the instructor.

Variables controllable by the instructor offer much greater latitude to the instructor interested in student course evaluation. Examples of these variables would be the structure of the course, instructional sequence, teaching techniques, use and, to a degree, selection of instructional materials.

Another vital step within the Analysis level of student course evaluation is the determination of evaluation indicators. Evaluation indicators can be defined as "measure units" of performance. Examples of evaluation indicators would be those terminal behaviors that indicate the attainment of the specific objectives. The identification of evaluation indicators is relatively simple within the cognitive domain. Much of the evaluation of students, however, involves the affective domain, and evaluation indicators within this domain are often elusive and unsystematic. An analysis of the evaluation indicators often involves what Lange call the "external" elements of evaluation.[32] External elements include the

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[32]Lange, op. cit., p. 1.

philosophy and methods of the subject being taught, the philosophy of the instructor toward the content and toward education in general, the "hidden agenda" in the course structure, and the constraints on the instructional procedures.

Level Two: Measurement.--The second level of the system illustrated by the model in Figure 4 is Measurement. Essentially this level is devoted to data gathering and tabulation. Based on the information synthesized in Level One, Analysis, the evaluator is ready to construct those instruments of measure that he believes to be best suited to assess the variables selected for measurement.

From Level One the evaluator has analyzed and delineated those areas that he wishes to evaluate utilizing student opinion and value judgments. The evaluator will likely use two types of measuring instruments: the formal techniques such as the questionnaire, the opinionnaire, the checklist, and the rating scale; and/or, the informal techniques such as test by observations, the interview and the third party interview. There are two guidelines regarding his task the evaluator will want to study and consider: (a) The evaluation is measuring opinion and value judgments, not comprehension and expertise; and (b) The external elements of the course design and evaluation may not lend themselves to structured evaluation techniques.

Webster[33] defines opinion as "a conclusion . . . held with confidence but falling short of positive knowledge." Value is defined as "the desirability or worth of a thing," and judgment as "the decision reached, as after consideration or deliberation." Using these definitions, the evaluator/instructor is able to conclude that his instruments should be designed to measure (a) student conclusions (opinions) about things and/or procedures; and, (b) student value judgments about the desirability or worth of content and/or instructional practices. As a rule, opinions can be measured most effectively by formal techniques and value judgments by informal techniques.[34]

Level Three: Action.--The results of the data gathering activity of Level Two, based on the synthesis derived from the activity associated with Level One, should produce indicators for action with respect to course design and procedures. Level Three of the Student Course Evaluation System is the point at which the data are collated, alternative courses of action are outlined, and finally, modifications and revisions are selected and implemented.

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[33] Webster's Seventh New Collegiate Dictionary, 1965.

[34] A. Kornhauser, "Constructing Questionnaires and Interview Schedules," Research Methods in Social Relations, ed. by M. Johoda, M. Deusch, and S. W. Cook (New York: Dryden Press, 1951).

Summary

A review of the evaluation process has indicated that a primary purpose of evaluation is to improve instruction. A review of systems analysis has indicated that systems analysis should be viewed as a framework for logical thinking and action.

Using the above generalizations as a basis, a System for Course Evaluation utilizing student opinions and value judgments was designed. The System has three levels of evaluation activity: Analysis, Measurement, and Action. Within each level are steps of specific action or determination relative to that level. Generally speaking, Level One, Analysis, is a preliminary level occurring at the start of the evaluation procedure and is dependent on previous course planning. Level Two, Measurement, is an activity running concurrent with the course instruction. Level Three, Action, can be considered a terminal activity although in actual practice it may be a concurrent activity with both Levels One and/or Two.

CHAPTER III

PROCEDURES AND METHODOLOGY

Purpose

The purposes of this study were: (1) to determine the effect of student course evaluation on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology; and, (2) to determine the effect of systematic two-way feedback on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology.

Population

The population (n=82) used in the study consisted of all of the graduate students completing Teacher Education 548: Audiovisual Media at Western Michigan University during the summer, 1970. Teacher Education 548 (TEED 548) is "A survey of audiovisual media as effective means for achieving educational objectives. Primary emphasis is upon the basic functions of communication as it applies to teaching-learning situations and the design of instructional messages from existing or created resources."[1] During the

[1]"TEED 548 Course Discription," Graduate Catalogue, Western Michigan University, Kalamazoo, Michigan, 1969.

summer session of 1970, three sections of TEED 548 were offered. An examination of demographic data (age, sex, teaching experience, and grade point average) gathered during the first class session of each section showed that there was not a significant difference in the make-up of the groups. Further, the statistical analysis procedure utilized in the study is suited to the analysis of data from intact, non-matched groups. All of the sections were taught by the same instructor. The course content, course objectives, examples, and course procedures, other than the variables under investigation, were the same for all sections.

Research Design

The experimental design used in the study was the Pretest-Posttest Control Group Design (design #4, the true experimental designs) outlined by Campbell and Stanley.[2] Each of the three sections of TEED 548 offered during the summer of 1970 were randomly assigned to one of three research treatments. The section designated as Group A received Treatment A: replication of Smith student course evaluation procedures. Group B received Treatment B: Smith student course evaluation procedures with systematic

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[2]Donald T. Campbell and Julian C. Stanley, "Experimental and Quasi-Experimental Designs for Research," Reprinted from Handbook of Research on Teaching, ed. by N. L. Gage, the American Educational Research Association (Chicago: Rand McNally & Company, 1966), pp. 13-24.

two-way feedback modifications and Group C received Treatment C: no treatment (control). Each of the three groups was administered, pre and post treatment, the New Educational Media Attitude (NEMA) inventory[3] with modifications[4] (see Appendix A), and a cognitive test, A Test for Audiovisual Media[5] (see Appendix B). Figure 5 graphically illustrates the research design.

Procedures

The following general research procedures were employed for all three sections:

1. Each subject was informed orally by the instructor and in written form on the course outline that he would be participating in a research study (see Appendix C).

2. Each subject was further informed that his participation in the research would not effect his grade in the course.

3. To increase the likelihood of candid and true evaluative data, each subject selected a three-digit number

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[3]Curtis Paul Ramsey, A Research Project for the Development of a Measure to Assess Attitudes Regarding the Uses of New Educational Media, Title VII, Project Number 492, National Defense Education Act of 1958, Grant Number 740095 (Nashville, Tennessee: George Peabody College for Teachers, December, 1961).

[4]Egon G. Guba and Clinton A. Snyder, Research and Evaluation on MPATI Telecasts, Final Report, R.F. Project 1367, Research Foundation (Columbus, Ohio: Ohio State University, April, 1964).

[5]David W. Hessler, "A Test for Audiovisual Media," Western Michigan University, Kalamazoo, Michigan, June, 1970. (Mimeographed.)

	Group A	Group B	Group C
Pretest	1. NEMA* 2. COGNITIVE TEST**	1. NEMA 2. COGNITIVE TEST	1. NEMA 2. COGNITIVE TEST
Treatment	Research Treatment A	Research Treatment B	Research Treatment C
Posttest	1. NEMA 2. COGNITIVE TEST	1. NEMA 2. COGNITIVE TEST	1. NEMA 2. COGNITIVE TEST

*New Educational Media Attitude Inventory.

**A Test for Audiovisual Media.

Figure 5.--Research Design.

(usually the last three numbers of the subject's social security number). This "unique" number was entered on every test instrument and used as an identification number by the researcher.

4. Each subject wrote his unique number on a 3" by 5" file card and inserted the card in a sealed envelope. At the outset of the administration of an instrument the envelopes were distributed to the subjects by name. The subject broke the seal on the envelope and entered his unique number on the instrument form. He then placed the 3" by 5" card with his unique number into a second envelope. This procedure was repeated at the administration of each evaluation instrument.

5. The researcher added a fourth digit to each unique number in order to identify subjects by groups.

6. All test instruments were machine scored by the Western Michigan University Testing Service. Standard answer forms and testing procedures were used.

Differences in Treatments

Treatment A

This Treatment consisted of a replication of the procedures outlined by Smith[6] and detailed in Chapter II of this study. Treatment A can be characterized as a system designed to provide student evaluative data to be

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[6]Jay C. Smith, "Design . . . " op. cit., Chapter II.

used by an instructor for course improvement. The system is linear and static involving one-way (student-to-teacher) feedback at fixed intervals. Figure 4 (page 32) is a graphic representation of the Smith model for course evaluation utilizing student opinion and value judgments.

Briefly, the student evaluation procedures involve three levels: (A) Analysis, (B) Measurement and (C) Action. Level A, Analysis, consists of a statement of the purposes and objectives of the course, specification of student terminal behaviors, selection of course instructional procedures, determination of evaluation indicators, and analysis of course population demographic data. Level B, Measurement, involves the collection of evaluative data from students. Both informal and formal measurement techniques are used. Questionnaires and opinionnaires are constructed from information derived from the analysis procedures that constitute Level A. (The formal measurements used during the summer of 1970 with Teacher Education 548: Audiovisual Media, Western Michigan University, are contained in Appendix D.) Measurements in the replication of the 1969 study (research Treatment A) were administered at the end of the first week of instruction, at the end of the fifth week of instruction and at the end of the tenth week of instruction. Level C, Action, occurs at the end of the instructional period. This level includes the formulation of alternatives for action, a decision regarding

course modifications, and implementation of course modifications.

Treatment B

Treatment B consisted of the same procedures as Treatment A with the exception of a modification of the system to allow systematic two-way feedback. Treatment B can be characterized as a system for course evaluation that is looped and dynamic involving two-way feedback at fixed but more frequent intervals. Formal measurements were conducted at the end of every second class session as opposed to the first, fifth, and tenth weeks as with Treatment A. Instead of the student evaluative feedback being one-way (student-to-teacher), the feedback in Treatment B was two-way (student-to-teacher and teacher-to-student). Because of the above modifications in the feedback variable, Level C, Action, was not limited to action only at the completion of the instruction but occurred throughout the term of instruction. Figure 7 is a graphical comparison of Treatment A with Treatment B.

Treatment C

Treatment C consisted of no treatment and thus Group C was the control in the research design.

TREATMENT A Course Evaluation System	TREATMENT B Course Evaluation System Revised
1. Model static; linear	1. Model dynamic; looped
2. Three steps: Analysis Measurement Action	2. Three steps: Analysis Measurement Action
3. Feedback to Students: NONE; closed loop	3. Feedback to Students: At Points: 2 A, B* 3 4 6
4. Current Course Revision: At point 5	4. Current Course Revision: At Points: 2 A, B 3 4 6 7
5. Future Course Revision: At point 9	5. Future Course Revision: At point 9
6. Feedback from Students: At points: 4 6 7 culminated at point 8	6. Feedback from Students: At points: 2 A, B 3 4 6 7 dispersed at each point culminated at point 8

*Numbers refer to points in the Course Evaluation System (Figure 6).

Figure 7.--Comparison of Treatment A with Treatment B.

Instrumentation

Cognitive

The cognitive test (see Appendix B) was written by the course instructor. The test consisted of forty-five items based on material covered during the instructional period. The test was submitted to a panel of three qualified authorities in audiovisual media prior to its use.[7] With the exception of two items which were modified, the panel agreed that the instrument was valid. The test was given at the first and last class sessions.

Attitude

The instrument used to measure attitude toward instructional technology in the study being reported was the New Educational Media Attitude (NEMA) inventory. The original instrument was designed by Ramsey to test the hypothesis that "curriculum and supervisory personnel, and audiovisual workers, have significantly different mean scores on a measurement of attitude toward the uses of newer educational media."[8] The outcome of the research was, however, that "The research provided an instrument

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[7]The Panel members were Dr. David Curl, Professor of Teacher Education, Western Michigan University; Dr. Ken Dickey, Associate Professor of Teacher Education, Western Michigan University; and, Mr. Fred Brail, Assistant Director of the Educational Resources Center, Western Michigan University.

[8]Ramsey, op. cit., p. 3.

useful in discriminating between individuals possessing attitudes hostile to or in sympathy with the uses of newer educational media for instructional purposes."[9]

This instrument was used by Guba and Snyder in their research on MPATI telecasts.[10] They attempted to measure generalized attitudes toward media with the instrument developed by Ramsey. Guba and Snyder found, however, that:

> The original form of the instrument was judged unsuitable for direct use because its terminology seemed oriented toward the older audiovisual devices and because some of the item content was deemed unsuited to the audience at hand. Accordingly, the number of items which were retained were rewritten to give wider and more current meaning to the items.[11]

In the final version of their study, Guba and Snyder used twenty-three items. Hudspeth[12] further modified the instrument by substituting the word "students" for the word "children" in questions 7, 11, and 18. The Hudspeth version of the instrument was used intact in the study being reported and is contained in Appendix A. Although Hudspeth reports no reliability figures as to the instrument, Guba and Snyder report a reliability of r=0.85.[13]

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[9] Ibid., p. 12.

[10] Guba and Snyder, op. cit.

[11] Ibid., p. 59.

[12] DeLayne R. Hudspeth, "A Study of Belief Systems and Acceptance of New Educational Media with Users and Non-Users of Audiovisual Graphics" (unpublished Ph.D. dissertation, Michigan State University, 1966).

[13] Guba and Snyder, op. cit., p. 12.

In a later study, Margoles[14] reports a similar correlation of r=0.86. Table 1 shows the baseline data on the New Educational Media Attitude inventory as provided by the three studies cited.

The instrument is scored on a six-point Likert scale ranging from a "1--agree strongly" to "6--disagree

TABLE 1.--Baseline Data for NEMA.*

Item	Guba-Snyder	Hudspeth	Margoles
n	573	36	70
m	67.1	64.8	71.4
SD	15.9	--**	17.2
reliability	0.85	--**	0.86

*New Educational Media Attitude inventory.

**Information not given.

strongly." In order to avoid response set, some items in the instrument are phrased negatively. These items were reverse scored in arriving at a total score. High total scores for subjects indicate an unfavorable attitude toward educational media. Low total scores indicate a favorable attitude.

[14]Richard A. Margoles, "A Study of Media Use Attitudes, And Barriers As Measurements for Evaluating The Influence of Extra-Media Support Service on Faculty Teaching in Large Classrooms" (unpublished Ph.D. dissertation, Michigan State University, 1969).

Statistical Analysis

The data were analyzed statistically by using a one-way multivariant analysis of covariance procedure. The multivariant analysis of covariance procedure was used because it took into account both the NEMA and cognitive test scores simultaneously. The multivariant technique is appropriate because it takes into account the statistical interdependence of the two measures (NEMA and A Cognitive Test for Audiovisual Media) which were taken on the same subjects at the same point in time.

The analysis of covariance technique has several advantages. Primary among these is that the procedure is suited to the analysis of data from intact, non-matched groups.

> The era of exhaustive person-to-person matching appears now to be over, for analysis of covariance achieves the same results without the testing and discarding numerous Ss in search of matched pairs. Because it is so superior and efficient and involves no computional effort now that standard programs are available on computers, analysis of covariance is rapidly replacing the older, matching technique.[15]

A second advantage of the analysis of covariance technique is that:

> Like analysis of variance, the model from which it is derived, analysis of covariance can be used in both single-classification form, that is when there

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[15]Deobold B. VanDalen, Understanding Educational Research: An Introduction (New York: McGraw-Hill, 1966 (rev. ed.)), p. 259.

> is only one independent variable, and multiple-classification form, when there are two or more independent variables.[16]

In the study being reported the research Treatments A (student course evaluation) and B (systematic two-way feedback) and C (control) are the independent variables and attitudes toward instructional technology and cognitive performance in instructional technology instruction are dependent variables.

> It is convenient in analysis of covariance problems to speak of the dependent variable as the criterion variable and the relevant variable(s), for which we wish to make adjustments, as the control variable(s) . . . . The rationale underlying analysis of covariance involves a combination of analysis of variance and regression concepts. In its most basic form, we might think of analysis of covariance first determining the magnitude and direction of the relationship between the control variable(s) and the criterion variable(s). Having determined this, the procedure then statistically readjusts each criterion score, through a regression prediction technique, so that the scores compensate for whatever control variable disparity exists between the independent variable groups. Having done this, the adjusted scores are then subjected to an analysis of variance which tests for mean differences by identifying the amount of variation resulting from differences between the groups. An F ratio is produced which is interpreted in the usual manner. Finally, the actual means achieved may be adjusted to compensate for differences on the control variable(s).[17]

A third advantage of the analysis of covariance procedures in educational research has to do with its precision. As stated by Campbell and Stanley:

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[16] James W. Popham, Educational Statistics: Use and Interpretation (New York: Harper and Row, Publishers, 1967), p. 224.

[17] Ibid., pp. 224-225.

> Since the great bulk of educational experiments show no significant difference, and hence are frequently not reported, the use of this more precise analysis (analysis of covariance) would seem highly desirable.[18]

In the study being reported, the one-way multivariant analysis of covariance was computed by using the Control Data Corporation 3600 computer at Michigan State University. The data were input to the program, Multivariate Analysis of Variance (Analysis of Covariance) programmed by Jeremy Finn of the State University of New York at Buffalo and adapted for the Michigan State University Control Data Corporation 3600 by William H. Schmidt.

The probability level selected for rejecting the null hypotheses was at the .05 alpha level. "It has been conventional in behavioral science research work to use the 0.05 level of significance."[19] Choosing the .05 alpha level reduces the probability that the error of finding differences due to chance is 5 of 100.

Statistical Hypotheses

To determine the effect of student course evaluation and systematic two-way feedback on attitudes toward instructional technology and their effect on cognitive performance in a graduate course in instructional technology, four statistical hypotheses were generated and tested. Each

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[18] Campbell and Stanley, "Experimental and Quasi-Experimental Designs for Research," op. cit., p. 23.

[19] Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehart and Winston, Inc., 1964), p. 169.

null hypothesis tested is presented first, followed by an accompanying alternate hypothesis.

Effect of Student Course Evaluation

Null Hypothesis 1_a: When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.

Alternate Hypothesis 1_a: When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will be greater than without that opportunity.

Null Hypothesis 1_b: When given the opportunity to evaluate systematically a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.

Alternate Hypothesis 1_b: When given the opportunity to evaluate systematically a course of instruction, students' level of attitude toward the content of the course will be more positive than without that opportunity.

Effect of Systematic Two-Way Feedback

Null Hypothesis 2_a: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.

Alternate Hypothesis 2_a: When given the opportunity for systematic two-way feedback on a course of instruction, student's level of cognitive performance in that course will be greater than without that opportunity.

Null Hypothesis 2_b: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.

Alternate Hypothesis 2_b: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will be more positive than without that opportunity.

Summary

Three sections of Teacher Education 548: Audiovisual Media were offered during the summer, 1970 at Western Michigan University. Each of the sections was randomly assigned to one of three research treatments. Treatment A consisted of a replication of procedures developed by Smith[20] for course evaluation utilizing student opinions and value judgments. Treatment B consisted of application of the same procedures with modifications involving systematic two-way feedback. Treatment C was a control. Subjects in each treatment group were given, pre and post treatment, the New Educational Media Attitude inventory and an instructor written cognitive test, A Test for Audiovisual Media. The experimental design used in the study was a Pretest-Posttest Control Group Design.

To determine the effect of student course evaluation and systematic two-way feedback on attitudes toward instructional technology and their effect on cognitive performance in a graduate course in instructional technology, four statistical hypotheses were generated. The hypotheses were tested using the one-way multivariant analysis of covariance

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[20]Jay C. Smith, "Design . . . " op. cit., Chapter II.

procedure. The probability level selected for rejecting the null hypotheses was at the .05 alpha level.

CHAPTER IV

ANALYSIS OF DATA

Analysis of Data

The statistical hypotheses were tested using a one-way multivariant analysis of covariance procedure. Scores on a cognitive test, determined as the number right, and scores on an attitude inventory, determined as low score having the more positive attitude, were used as the dependent variables. The independent variable was the three treatment groups. All hypotheses were tested using the .05 alpha level with the appropriate degrees of freedom. Statistical data are contained in Appendix E.

A summary of the analysis is reported in Table 2 and Table 3. Following the tables each of the null hypotheses is stated and the related data presented.

The multivariant analysis of covariance test of equality of mean vectors yielded a F-ratio of 9.25 (degrees of freedom 4 and 152) which was significant at the P=.0001 level. While this does not locate the source of the difference between groups, it does indicate that at least one treatment condition did have a significant influence on either the NEMA Posttest and/or the Cognitive Posttest. The appropriate subsequent analyses were conducted so that the exact source of treatment influence could be identified.

TABLE 2.--Group Means.[1]

Research Treatment[2]	NEMA Pretest[3]	NEMA Posttest	COGNITIVE Pretest[4]	COGNITIVE Posttest
A	58.03	48.07	20.55	29.03
B	59.04	43.37	20.50	29.00
C	56.72	52.31	20.03	25.86

[1]Rows are groups; columns are variables.

[2]Research Treatment A: Replication of procedures developed by Smith for course evaluation utilizing student opinions and value judgments. Research Treatment B: Application of same procedures with modifications involving systematic two-way feedback. Research Treatment C: No treatment--CONTROL.

[3]New Educational Media Attitude inventory; low scores indicate favorable attitude (see Appendix A).

[4]Cognitive test, A Test for Audiovisual Media (see Appendix B).

TABLE 3.--Multivariant Analysis of Covariance.

Variable	F-value	Probability
NEMA post	11.79	0.0001
COGNITIVE post	6.98	0.0017
Degrees of Freedom for Hypothesis	2	
Degrees of Freedom for Error	77	

The analysis of covariance on posttest measures is presented in Table 3.

Hypotheses

Effect of Student Course Evaluation

Null Hypothesis 1_a: When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.

Alternate Hypothesis 1_a: When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will be greater than without that opportunity.

A one-way multivariant analysis of covariance on the cognitive interactions produced a F-value of 11.79 and a P=0.0001. Therefore at the .05 alpha level, the null hypothesis is rejected.

Null Hypothesis 1_b: When given the opportunity to evaluate systematically a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.

Alternate Hypothesis 1_b: When given the opportunity to evaluate systematically a course of instruction, students' level of attitude toward the content of the course will be more positive than without that opportunity.

The one-way multivariant analysis of covariance procedure on attitude interactions produced a F-value of 6.98 and a P=0.0017. At the .05 alpha level, the null hypothesis is rejected.

Effect of Systematic Two-Way Feedback

To compare treatments and statistically compute the effect of systematic two-way feedback (Research Treatment Group B) with non-systematic one-way feedback (Research Treatment Group A), and/or with no feedback (Research Treatment Group C), an Incidental or Post-hoc Comparison in Data was computed.

> This technique for comparisons is applicable to the situation where a preliminary analysis of variance and F test has shown over-all significance . . . if the experimenter has found evidence for over-all significance among his experimental groups, he may use this method of post-hoc comparisons to evaluate any comparisons among means.[1]

Using the technique outlined by Hays[2] (see Appendix E), a critical difference of 3.16 in mean scores was determined as being significant between groups.

> Null Hypothesis 2_a: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.
>
> Alternate Hypothesis 2_a: When given the opportunity for systematic two-way feedback on a course of

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[1] William L. Hays, Statistics (New York: Holt Rinehart and Winston, 1963), p. 483.

[2] Ibid., pp. 483-485.

instruction, students' level of cognitive performance in that course will be greater than without that opportunity.

The cognitive posttest mean score for Treatment A was $\bar{X}$=29.03 (see Table 2), for Treatment B, $\bar{X}$=29.00 and Treatment C, $\bar{X}$=25.86. There was not a difference in mean scores of 3.16 between Treatment A and Treatment B nor between Treatment B and Treatment C. There was a difference of 3.17 between Treatment A and Treatment C. The difference between Treatment B (two-way feedback) and Treatment C (control) was not 3.16 therefore, as it is stated, the null hypothesis cannot be rejected.

Null Hypothesis 2_b: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.

Alternate Hypothesis 2_b: When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will be more positive than without that opportunity.

The New Educational Media Attitude (NEMA) inventory posttest mean score for Treatment A was $\bar{X}$=48.07 (see Table 2), for Treatment B, $\bar{X}$=42.37 and Treatment C, $\bar{X}$=52.31. The mean score difference between Treatment A and Treatment B was 5.70 and between Treatment A and Treatment C, -4.24. The mean score difference between Treatment B and Treatment C was -9.94. On the NEMA inventory, a low score is indicative of positive attitude toward media. Since the differences between mean scores for all research treatments were greater

than the post-hoc comparison critical difference of 3.16 the null hypothesis is rejected.

Summary

Four statistical hypotheses were generated and tested: Two of the hypotheses were designed to determine the effect of student course evaluation on cognitive performance in a graduate course in instructional technology and its effect on attitudes toward instructional technology. Two additional hypotheses were designed to determine the effect of systematic two-way feedback on cognitive performance in a graduate course in instructional technology and its effect on attitudes toward instructional technology. A one-way multivariate analysis of covariance procedure was used to test Hypotheses 1_a and 1_b for significance at an alpha level of .05. A Post-hoc Comparison in Data technique was used to test Hypotheses 2_a and 2_b. A summary of the results of the statistical analysis is presented in the following table. A discussion of the findings and their implications will be found in Chapter V.

TABLE 4.--Summary of Results.

	Null Hypothesis	Statement of Rejection or Non-Rejection
1_a:	When given the opportunity to evaluate systematically a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.	Rejection*
1_b:	When given the opportunity to evaluate systematically a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.	Rejection*
2_a:	When given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course will not be greater than without that opportunity.	Non-Rejection**
2_b:	When given the opportunity for systematic two-way feedback on a course of instruction, students' level of attitude toward the content of the course will not be more positive than without that opportunity.	Rejection**

*Significant at or above the .05 alpha level.

**See Table 5.

TABLE 5.--Summary of Results: Post-hoc Comparison in Data.

Research Treatment	Posttest	$\bar{X}$	A - B	A - C	A - C
A	COGNITIVE	29.03	.03	3.17*	--
	NEMA**	48.07	5.70*	-4.24*	--
B	COGNITIVE	29.00	.03	--	3.14
	NEMA	42.37	5.70*	--	-9.94*
C	COGNITIVE	25.86	--	3.17*	3.14
	NEMA	52.31	--	-4.24*	-9.94*

*Difference in mean score greater than post-hoc critical difference of significance at 3.16 or above.

**Low score indicates positive attitude toward media.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The study reported had two purposes: One purpose was to determine the effect of student course evaluation on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology. A second purpose of the study was to determine the effect of systematic two-way feedback on attitudes toward instructional technology and its effect on cognitive performance in a graduate course in instructional technology.

Three sections of Teacher Education 548: Audiovisual Media were offered during the summer, 1970 at Western Michigan University. Each of the sections was randomly assigned to one of three research treatments. Treatment A consisted of a replication of procedures for course evaluation utilizing student opinions and value judgments developed by Smith[1] and detailed in Chapter II of the study. Treatment B consisted of application of the same procedures with

[1]Jay C. Smith, "The Design and Trial of A Course Evaluation System Utilizing Student Opinions and Value Judgments" (unpublished M.Ed. dissertation, University of Hawaii, 1969).

modifications involving systematic two-way feedback. Treatment C was a control. Subjects in each treatment group were given, pre and post treatment, the New Educational Media Attitude (NEMA) inventory[2] and an instructor written cognitive test, A Test for Audiovisual Media.[3] The experimental design used in the study was a Pretest-Posttest Control Group Design.

Four statistical hypotheses were generated and tested. Two of the hypotheses were designed to determine the effect of student course evaluation on cognitive performance in a graduate course in instructional technology and its effect on attitudes toward instructional technology. Two additional hypotheses were designed to determine the effect of systematic two-way feedback on cognitive performance in a graduate course in instructional technology and its effect on attitudes toward instructional technology. A one-way multivariate analysis of covariance procedure was used to test Hypotheses 1_a and 1_b for significance at an alpha level of .05 with appropriate degrees of freedom. A Post-hoc Comparison in Data technique was used to test Hypotheses 2_a and 2_b.

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[2]Curtis Paul Ramsey, A Research Project for the Development of a Measure to Assess Attitudes Regarding the Uses of New Educational Media, Title VII, Project Number 492, National Defense Education Act of 1958, Grant Number 740095 (Nashville, Tennessee: George Peabody College for Teachers, December, 1961).

[3]David W. Hessler, "A Test for Audiovisual Media" (Kalamazoo, Michigan: Western Michigan University, June, 1970). (Mimeographed.)

Conclusions

The analysis of the data supports the following conclusions:

1. When given an opportunity for systematic evaluation of a course of instruction, students' covnitive performance in that course is better and their attitude toward the contant of the course is more positive than when such evaluation opportunity is not afforded.

2. Although when given the opportunity for systematic two-way feedback on a course of instruction, students' level of cognitive performance in that course is not materially affected their attitudes toward the content of that course are significantly more positive then when such feedback opportunity is not afforded.

3. Students' attitude toward the content of a course is more positive when given the opportunity for systematic two-way feedback on that course of instruction than when only given the opportunity for systematic evaluation of the course of instruction without the opportunity for systematic two-way feedback.

Discussion

In the study reported, the term evaluation was defined in terms of the purpose of evaluation:

> Evaluation is seen as an instrument of reform . . . both an act and a result. The reason for evaluating any present activity or program is to improve it.[4]

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[4]Robert C. Pace, "Evaluation Perspectives: '68," Transcript of a speech delivered to the American Educational Research Association (AERA) presession (Chicago: February, 1968), p. 3. (Mimeographed.)

The study reported was an investigation of the effect of evaluation by student participants of a course. The assumption was that such evaluation would contribute to course improvement.

Educational research should result in guidelines for educational practices and procedures. An experiment by Gage, Runkel and Chatterjee[5] indicated that when teachers are given feedback on their performance (pupil's ratings of their actual and ideal teacher on twelve items), they changed in the direction of their pupil's ideal teacher, as measured by pupil's subsequent descriptions of the teacher. This observation combined with Ryan's basic assumption, detailed in the Theory section of Chapter I of the study, that "teacher behavior is observable;"[6] and, further, with H. H. Remmers' statement that " . . . research has demonstrated that student evaluation is a useful, convenient, reliable, and valid means of self-supervision and self-improvement for the teacher,"[7] gives credence to the value of the study undertaken.

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[5]N. L. Gage, P. J. Runkel, and B. B. Chatterjee, "Equilibrium Theory and Behavior Change: An Experiment in Feedback from Pupils to Teachers" (Urbana: Bureau of Educational Research, University of Illinois, 1960). (Mimeographed.)

[6]David G. Ryans, Characteristics of Teachers (Washington, D.C.: American Council on Education, 1960), p. 19.

[7]H. H. Remmers, "Rating Methods in Research on Teaching," in Handbook of Research on Teaching, ed. by N. L. Gage, American Educational Research Association (Chicago: Rand McNally and Company, 1963), p. 367.

Remmers lists fourteen "major generalizations from these (student rating of teachers) researches"[8] (see Appendix E). The study reported does not add a fifteenth major generalization to the list. What it does do, however, is contribute to an identification and definition of a promising area for additional research as discussed below.

Recommendations

Two classifications of suggestions are given below. One type is suggestions for further research and is based on the findings of the study and the insights gained during the course of the study. The final suggestion is implications of the study for instructional technology instruction.

Suggestions for Further Research

> Treatment A.--Replication of procedures for course evaluation by students developed by Smith[9] and detailed in Chapter II of the Study.

Although Treatment A was a replication of an earlier study and the results of the first study were replicated, the first recommendation is that this study be replicated across instructors and different age levels. The first study by Smith was conducted with undergraduate students (n=126) enrolled in a first course in instructional technology. The present study was conducted with graduate students (n=82) enrolled in a first course in instructional

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[8] Ibid., p. 367.

[9] Smith, op. cit.

technology. In both studies, subjects in the respective populations, although enrolled in different sections, were taught by the same instructors. Had not the study demonstrated significance between treatment and control groups, a likely confounding variable could have been identified as the instructor. The data now in hand are not, however, conclusive enough to generally eliminate the possibility of instructor influence. Additional research needs to be done employing the system for course evaluation by students with groups of students enrolled in a variety of courses taught by different instructors.

Another research need is to use the system of course evaluation by students with different age levels. The evidence now recorded is limited to subjects aged twenty to fifty-four, all having at least three years of college (see Appendix D, Demographic Questionnaire). Also, there has been no effort to determine the effect of the system on subjects by sex.

A final need for additional research regarding Treatment A is that there should be an empirical analysis of the relationship of each of the components of the system with the other components of the system: What happens when one component is left out? How does one component interact with another and on a third?

> Treatment B.--Application of the same procedures as in Treatment A with modifications involving systematic two-way feedback.

The first recommendation for additional research relative to Treatment B is that this study be replicated to determine if the investigated relationships are universal or specific to the group examined. The reported study indicates that systematic two-way feedback does not have a significant effect on cognitive performance on a course of instruction but does have a significant effect on positive attitude toward the content of the course. The findings relative to cognitive performance may be limited to the group tested. The study did demonstrate that there was a significant effect on cognitive performance when students' are given the opportunity to evaluate systematically a course of instruction. Logic would seem to favor the contention that greater involvement of the students in the course through systematic two-way feedback would result in a significant effect on cognitive performance as it did on attitudes toward the content of the course. Only additional research will answer this question.

A second area relative to Treatment B, in need of additional research is the definition and specification of the "systematic" component of systematic two-way feedback. In the study reported, two-way feedback was conducted in a systematic manner at the end of every second class session. The selection of every second session was an arbitrary decision made by the researcher. The effect of two-way feedback on cognitive performance and attitude may be

altered by different intervals. There is also a need to determine the relative effect of different feedback techniques. In the study reported, the feedback was formal at fixed intervals (see Appendix D, Sample Course Evaluation Questionnaire). It may be that informal techniques would have a different effect. It may be, further, that a combination of formal and informal techniques would result in a different effect on cognitive performance and attitude than would either technique alone. Speculations such as above need to be generated into hypothesis form and tested.

Research Design and Procedures.--An obvious limitation of the study reported, and of most educational research, is that the research was limited in both time and situation. The study was conducted over a ten-week period. A study should be designed that would provide data regarding the actual behavior of the subjects over time when functioning within teaching environments. This is especially true of the attitude component of the study reported. Over time with the development of new technologies, the cognitive content of a course in instructional technology likely will be modified and, perhaps, totally changed. A positive attitude toward instructional technology, it is hoped, will remain constant. Longitudinal research in education is not common. Nonetheless, the attitude variable of the

research reported should be investigated by "follow-up" types of research designs.

A concern throughout the course of the research has had to do with the precision of the instrument used to measure media attitudes. Even though developmental and testing data for the New Educational Media Attitude (NEMA) inventory (see Chapter III, Instrumentation) suggest that the NEMA is a suitable indicator of attitudes toward educational media, it is justifiable to speculate that respondents may have widely varying attitudes toward different aspects of educational media. An attitude measurement instrument which provides indications of attitudes toward various aspects of educational media might be of greater validity for the type of research reported. Paul Dawson at the Teaching Research Division, Oregon State System of Higher Education, is currently testing an instrument, the Media Attitude Profile (MAP),[10] which shows promise for that type of application. As more precise instruments--such as the MAP may become--are developed, the study reported should be replicated using those instruments.

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[10]Paul Dawson, "Attitudes Toward Instructional Media and Technology: Refinement and Validation of the Media Attitude Profile," Continuation proposal for Research submitted to the U.S. Commissioner of Education for support through authorization of the Bureau of Research (Monmouth, Oregon: Teaching Research Division, Oregon State System of Higher Education, June 1, 1970). (Mimeographed.)

Implications for Instructional Technology Instruction

The reported study may have implications for the general area of teaching-learning. As additional research is done involving a broader cross-section of the general area of teaching-learning, it is likely that those implications will become more apparent. The study reported and the one preceding it were designed to determine the effect of systematic course evaluation by students on cognitive performance and attitudes toward the content of a course in instructional technology. The writer will, therefore, limit his discussion of the implications of the study to instructional technology instruction.

Educators in the area of instructional technology have for many years professed that they are"missionaries." The Commission on Instructional Technology Report has indicated that the majority of the teaching profession are aware of instructional technology and the value of technology in instruction (see Chapter I, Need for the Study). The report also states that its actual use in instruction is minimal and research in the area has indicated that there are several barriers that contribute to the minimal use of technology in education. Two of the identified barriers are attitudes of teachers and lack of adequate training. In the study reported, systematic course evaluation by students and systematic two-way feedback on a course have been demonstrated to have a positive effect on

attitudes toward the content of the course. Systematic course evaluation by students has been demonstrated to have a positive effect on cognitive performance in a course.

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APPENDICES

APPENDIX A

NEWER EDUCATIONAL MEDIA ATTITUDE INVENTORY

NEWER EDUCATIONAL MEDIA _____ _____

During the past twenty years or so many new teaching aids have been developed. Some of these are sufficiently elaborate to change or even to replace temporarily the classroom communication processes which were formerly pretty much limited to students and teachers. Radio, television, motion pictures, slides and filmstrips, and phonograph and tape recorders, certain types of teaching machines and programmed learning methods--all are examples of what might be termed the "Newer Educational Media." (NEM)

In American education today, there is some controversy concerning these NEM. The following statements represent various points of view on this question.

Please indicate the extent of your agreement or disagreement with each statement. Please do not make efforts to be consistent or to select the "right answer"--there are none. Simply enter the proper number in the space before each sentence according to the following code:

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

____ 1. The widespread use of the NEM will revolutionize the process of instruction as we know it now.

____ 2. The possible uses of the NEM are limited only by the imagination of the person directing the usuage.

____ 3. The wide resources of the NEM stimulate the creative student.

__R__* 4. There are no educational frontiers in the NEM--just new gadgets.

__R__ 5. Most students see the NEM mainly as entertainment, rather than as education.

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*Items designated "R" were designed as "negative" items and are reverse scored in determining the subject's attitude.

NEWER EDUCATIONAL MEDIA

Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

R 6. Most teachers lose the gratification of personal accomplishment when the child is taught by machine.

____ 7. Use of the NEM constitutes a major advance in providing for individual differences in the learning needs of students.

____ 8. Much wider usage of the NEM is needed.

R 9. The vicariousness of learning by NEM aids is not conducive to the most effective learning.

____ 10. If surplus funds exist which could be spent only for supplementary books or for more NEM equipment, the latter should be chosen.

R 11. Students can learn the basic value of a good education only when taught by conventional methods--not by the NEM.

R 12. The problems of getting materials and equipment when you need it, darkening rooms, setting up the equipment, and otherwise disrupting classes tend to counteract the value of most NEM.

R 13. The "authoritative" presentations of most of the NEM tend to produce an uncritical acceptance on the part of most students.

R 14. The passive quality of learning by NEM is not conducive to the most effective learning.

R 15. The proper student attitudes for effective learning are not developed as well by the NEM as by conventional methods of teaching.

____ 16. Only through the NEM can vicarious learning experiences be provided in the classroom.

NEWER EDUCATIONAL MEDIA

Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

R 17. The expense of most of the NEM is out of all proportion to their educational value.

R 18. The NEM give little opportunity to provide for the individual differences of students.

R 19. The personal relationship between teacher and student is essential in most learning situations.

R 20. NEM materials are so specific as to have little adaptability to different teaching requirements or situations.

R 21. With increased usage of the NEM, the teaching role may be down-graded to clerical work, proctoring, grading, and other simple administrative tasks.

____ 22. The development of NEM centers in every school unit should be encouraged and facilitated.

R 23. The NEM do not suitably provide for the special needs of either slow learners or brighter students.

APPENDIX B

A TEST FOR AUDIOVISUAL MEDIA

A TEST FOR AUDIOVISUAL MEDIA*

PURPOSE: This test is given to students in TEED 548 for the purpose of determining the overall achievement level of the students enrolled. We are interested in the total group performance, not that of a particular individual. Your individual evaluation is in no way effected by this test.

DIRECTIONS: Do not write on the test. Use the WMU Testing Services form provided and mark the most correct responses to the questions and statements herein. Use a number two or number one lead pencil. Make only one mark per question. If you change an answer, erase the prior response completely. Please note that the numbered sequence runs horozontally across the answer sheet left to right. Thank you.

1. Communication and learning really mean the same thing.
   1. Yes
   †2. No

2. Response and interaction are usually not part of the definition of communication.
   1. True
   †2. False

3. Communication can be defined _____
   1. structurally.
   2. in terms of intent.
   3. functionally.
   †4. all of the above.
   5. structurally and in terms of intent only.

4. Nearly all descriptions of a communication situation include the following basic ingredients:
   1. medium, technology, stimulus, receptor
   2. transmitter, medium, source, receiver
   †3. source, message, channel, receiver
   4. feedback, receiver, source, message
   5. channel, transmitter, medium, receiver

5. Theories and models of communication assist the teacher in applying audiovisual materials in teaching and learning situations. Several useful models were developed by _____.
   1. Heider, Abedor, Smith and Witt
   2. Cohen, Schuller, Lemler, and Townsend
   †3. Berlo, Shannon-Weaver, Hovland and Schramm
   4. Smith, Berlo, Witt, and Lemler

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*Written by David W. Hessler, Western Mich. Uni., 1970.

†Indicates correct response.

6. Meaning of any communication is _____.
   1. improved with audiovisual materials
   2. improved with the specific media selected
   3. the message itself
   †4. within the receiver

7. Diffusion is a key process _____.
   †1. to get innovations adopted
   2. involved in writing teaching objectives
   3. in using audiovisual materials effectively
   4. to help teachers communicate

8. Without change, there can be no learning.
   †1. True
   2. False

9. Audiovisual materials include _____.
   1. all equipment used in teaching
   2. all media
   †3. films, tapes, maps, filmstrips, models, slides
   4. audio and visual materials only

10. Two major organizations developed standards for joint media programs for public schools. The organizations were:
   1. NAVA and AASL
   2. MEA and NEA
   †3. DAVI and ALA
   4. MAVA and MASL

11. Within the public schools, all teaching/learning resources are brought together in _____.
   1. the library
   2. the instructional materials center
   3. the learning center
   †4. all of the above
   5. none of the above

12. Robert Gagne' has proposed some _____ which should greatly assist the teacher in deciding upon specific instructional approaches.
   1. rules for using audiovisual materials
   2. criteria for writing learner objectives
   3. attributes of mediated instruction
   †4. conditions for learning

13. Audiovisual communication includes:
   1. verbal, visual, audiovisual, and non-verbal communication
   2. linguistics, pictics, tectonics
   3. syntactics, semantics, pragmatics
   4. none of the above
   †5. all of the above

14. Which of the following have the broadest communication value?
    †1. signs
    2. symbols
    3. signals
    4. all these stimuli have equal value

15. Robert Mager is best known for his writings about _____.
    1. effective ways to use audiovisual materials
    2. audiovisual research
    †3. behavioral objectives for the learner
    4. all of the above
    5. none of the above

16. With _____ you can dupe slides; make filmstrips from slides; make slides from filmstrips; and create effective title slides.
    1. A Leitz rotor and easel rig
    †2. an illumitran and Repronar
    3. an opaque projector and overhead projector
    4. a contract printer
    5. all of the above
    6. none of the above

17. A major source of film evaluations is the _____.
    1. Library of Congress film index
    2. Education Index
    3. Audiovisual Communication Review
    †4. Education Film Library Association

18. The National Information Center for Educational Media is a major source of _____.
    1. ratings of new AV resources
    2. audiovisual research findings for teachers
    †3. audiovisual material indexes
    4. audiovisual equipment evaluations and ratings
    5. all of the above

19. ERIC is important for teachers interested in _____.
    1. reports on new audiovisual equipment
    †2. media research
    3. audiovisual material evaluations
    4. simple production techniques for AV materials
    5. all of the above

20. Color coding of cards in the card catalog is one way to _____.
    1. evaluate and rate audiovisual resources
    †2. differentiate type of media
    3. correlate print and non-print resources
    4. classify the subject area of the material

21. Within most school systems, teachers acquire films _____.
   †1. from a film rental library
    2. from a regional center
    3. from the particular building only
    4. from the producer on a rental basis
    5. none of the above

22. Audiovisual materials should be evaluated _____.
    1. from reviews prior to preview
   †2. before, during, and after use
    3. immediately after use
    4. by the students

23. Goals and objectives are not the same thing for the teacher.
   †1. True
    2. False

24. Synchronization of sound and slides is possible but very expensive.
    1. True
   †2. False

25. Sychronization of picture and sound on a 16mm motion picture projector is accomplished by spacing of the upper loop and lack of slack around the sound drum.
    1. True
   †2. False

26. The focal length of any projection lens determines _____.
    1. the sharpness of the image
   †2. the size of the screen image
    3. The brightness of the screen image
    4. all of the above

27. The dry mount (heat) press uses _____.
   †1. MT-5
    2. Diazo
    3. Chartpak
    4. none of the above

28. In tape recording, a track is _____.
    1. either the dull or glossy side of the tape
    2. dull side of the tape
    3. glossy side of the tape
   †4. none of the above

29. Depth of field in photography is controlled by the shutter speed.
    1. True
   †2. False

30. The Kodak Visualmaker is used to make _____.
    1. overhead transparencies
    †2. closeups with an instamatic camera
    3. low cost visuals for the opaque projector

31. Opaque projectors and overhead projectors provide nearly equal image brightness at the same projection distance with lamps of equal brightness.
    1. True
    †2. False

32. EVR is a new low cost video camera for school use.
    1. True
    †2. False

33. Super 8mm is a larger image (frame) format.
    †1. True
    2. False

34. Closeups with a camera can be made with _____.
    1. bellows
    2. cu lenses
    3. extension tubes
    †4. all of the above

35. When projecting slides, the user should place them right side up, but flopped (backwards).
    1. True
    †2. False

36. Models and mockups are not the same thing.
    †1. True
    2. False

37. Using the microphone, is not the best way to record material from TV or radio on audio tape.
    †1. True
    2. False

38. Half inch video tape systems are not suitable for teacher or student programs.
    1. True
    †2. False

39. Cost/effectiveness is no longer a critical consideration for audiovisual media.
    1. True
    †2. False

40. Initial use of audiovisual materials will save the teacher time and effort.
    1. True
    †2. False

41. Generalizations about the design of audiovisual materials are too abstract to be useful for the classroom teacher today.
    1. True
    †2. False

42. Which of the following computer languages would be most useful for teachers and students to learn.
    1. FORTRAN
    †2. APL
    3. COBOL

43. The principal advantage of programmed instruction is that it frees the teacher for more effective teaching.
    1. True
    †2. False

44. Visual literacy differs from perception studies in that it allows the teacher to observe individual creation of visuals and visual sequence.
    †1. True
    2. False

45. Instructional development is a process involving only the teacher, his students, and his objectives.
    1. True
    †2. False

APPENDIX C

SAMPLE COURSE HAND-OUTS

Sample Course Hand-Out*

Teacher Education 548 — Summer 1970
Audiovisual Media — Mr. Hessler

General Requirements for the Course:

There will be a mid term and a short quiz based upon the student objectives which will be handed out in class for the units of study in the course.

Students will be expected to produce simple audiovisual materials both individually and as a small team. There will be some possibility for choices among the various production activities, but all the students will do a few of the production projects. These production projects will include: dry mounting; lamination; bulletin board design in reduced scale; overhead projectuals; handmade filmstrip (as a group) and others to be announced.

Students will be responsible for the assigned readings in the basic text, AV Instruction: Media and Methods; all handouts; and a limited amount of reading from materials placed on reserve in the Educational Resources Center at the front desk.

Students who have not been through the Self-Instructional Equipment Laboratory will be expected to schedule themselves through the different programs for the basic pieces of audiovisual equipment (operation) e.g. 16mm projector; combination filmstrip and slide projector; tape recorder; overhead projector; opaque projector and other short programs to be announced. All students will have some time to spend with individualized instruction of this type. The lab is located on the third floor of Sangren Hall on the left side of the short hallway leading to the photographic darkrooms and the graphics room. This short hallway is located behind the wood and glass door on the right side of the main corridor which runs into the main entrance of the ERC Reading Room.

During the Summer Term, all of the 548 classes will be a part of a study concerned with outside course evaluation. Students will be asked to fill in a number of forms which will in no way affect grades or individual evaluation.

There will be some other short assignments related to in class activities.

Notes:

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*Written by David W. Hessler, Western Mich. Uni., 1970.

Sample Course Hand-Out

Teed 548 Audiovisual Media
Western Michigan University

Unit I Communication

General Student Goals

1. Become familiar with several different communication models and the names of the individuals associated with the models discussed in class and those on the handouts.

2. Select a particular model of communication which helps you organize your thinking about the functions of the communication process.

3. Be able to identify some of the components or elements of these models which are common to all of them.

4. Recall some of the more important variables associated with the basic communication model elements and relate the constraints they place on the use or the consideration to use audiovisual media.

5. Use this conceptual framework when planning to select, use, or evaluate audiovisual media (materials or equipment).

6. Learn to apply the Abedor (with minor modifications by Hessler) model in attempting to solve instructional problems which necessitate the design and production of audiovisual media in some form.

7. Be able to tell others how to use the two models.

Student Objectives

1. Identify the names of individuals responsible for some common communication models discussed in class and provided on handouts and separate these names from a list which would inculde other unrelated names.

2. Select a single communication model from those discussed or given as a handout and be able to reproduce the model without consulting notes or other aids. The reproduction should include the pattern and the labels properly positioned.

3. From the model reproduced in #2 above, be able to list several variables associated with each of the major components (or elements) of the communication model.

Unit I Communication

4. From the model selected in #2 above, be able to discuss in written form how each of the elements (variables) in the model might affect your decision to use or not to use a particular type of audiovisual media.

5. The concept of noise in communication takes on particular utility when planning or evaluating the use of a single medium which uses audio, visual (video), or audiovisual channels of communication. Given a detailed description of a situation in which audiovisual media is used, be able to recognize all of the examples of "noise" in the channel(s) and suggest at least one way to correct or eliminate the noise in each example identified.

6. Without aids, be able to reproduce the entire Abedor (with minor modifications by Hessler) Model. Select a message design problem of your own and explain how this model with its various functions and steps leads you to a solution. Include all of the functions in your written explanation.

7. In your own words, be able to define the type of model used in this unit and explain its utility to the individual using audiovisual media.

8. On a written examination, differentiate the terms audiovisual media; instructional media; audiovisual materials; hardware; software; print media; non-print media with regard to their scope, duplication of meaning, and differences in meaning. Cite examples of items which might be included within the definition of each term.

9. From the code dimensions suggested by Krampen, list four code divisions which suggest the channels available in audiovisual communication. List two examples (or be able to identify two) of audiovisual materials for each of the channels within the code divisions you were able to identify.

10. Prepare a written explanation of Dale's Cone of Experience and describe the most common interpretation as to what the model (the Cone) represents (do not be concerned with memorizing all the levels of the Cone, but concern yourself with the extremes of the top and base).

11. Given two types of communication stimuli (signs) explicate the difference between signals and symbols and identify the given signs as to whether they are signals or symbols.

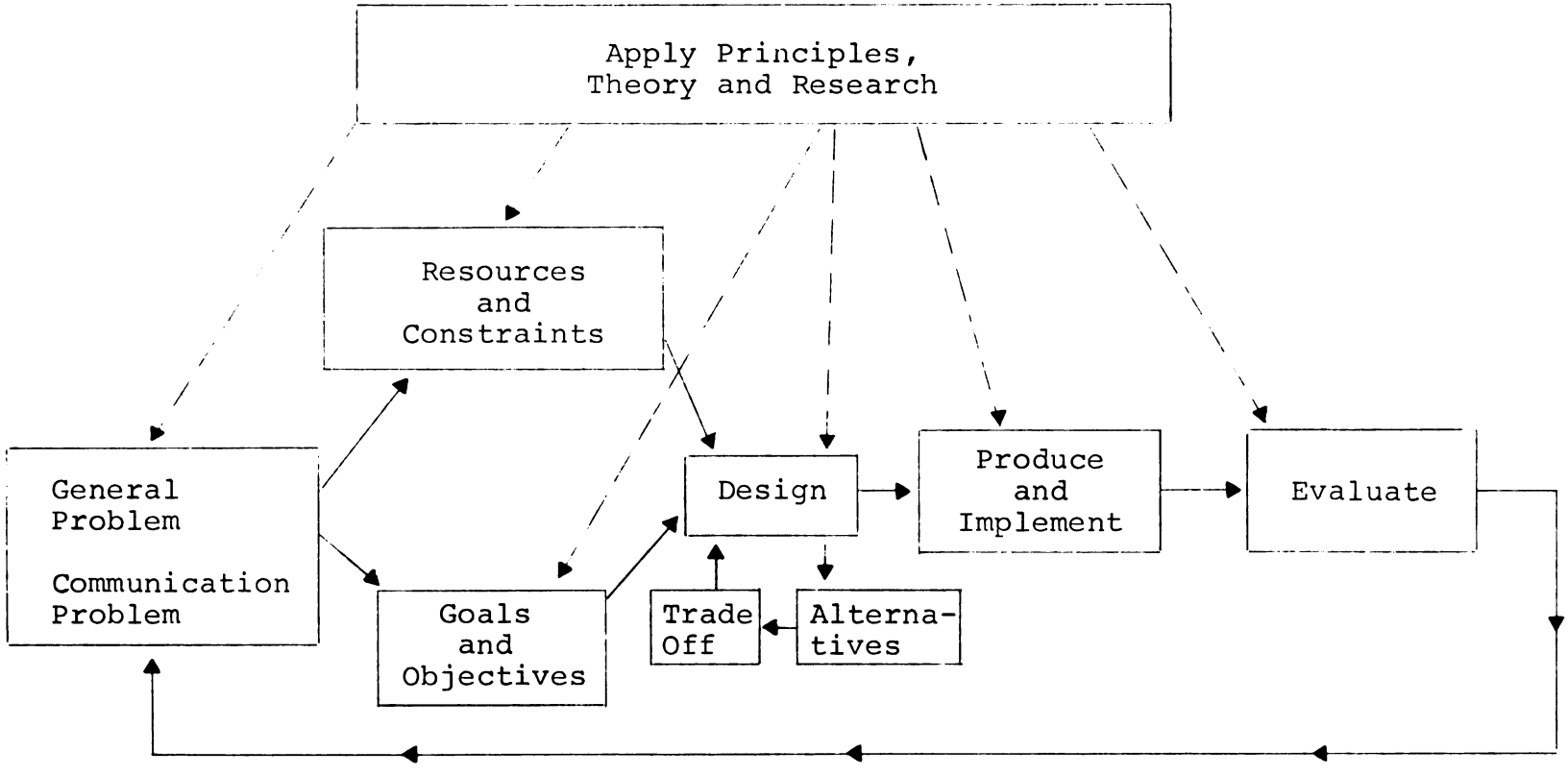
Unit I Communication

12. Given the terms dennotative, connotative, and referent, define each and explain their differences and their relationship to communication signals.

13. Semiotics provides one with a basis for talking about message systems. The Morris Semiotic (a class handout) illustrates ways to discuss the three domains of syntactics, semantics, and pragmatics. Be able to describe how signs are related to other things within each domain and cite examples of how each sign relationship is taken into account by the person using audiovisual materials in the classroom.

Notes

ABEDOR AND HESSLER MODEL FOR DESIGNING A MESSAGE



NOTES

APPENDIX D

SAMPLE COURSE EVALUATION QUESTIONNAIRES

PLEASE DO NOT WRITE YOUR NAME ON THIS QUESTIONNAIRE:

This questionnaire is the first of several that you will be asked to complete during this term. These questionnaires are designed to ascertain certain facts about students enrolled in this course. They in no way affect your grade in the course.

DIRECTIONS:

Read each question throughly before answering. Please answer all questions by circling the letter of the alphabet next to the correct answer. There may be more than one correct answer to some questions. When filling in blanks please print. The Essay questions may be written in longhand but please write legibly. If for some personal reason you do not wish to answer any one of the questions simply leave the question unanswered. Do not put your name on this questionnaire.

THANK YOU

1. SEX
   A. Female
   B. Male

2. BIRTHDATE:
   A. Month _____
   B. Day _____
   C. Year _____

3. CLASSIFICATION:
   A. Junior
   B. Senior
   C. Graduate-Masters
   D. Graduate-Post Masters

4. Are you now teaching?
   A. Yes
   B. No

5. Are you or do you plan to teach in Michigan?

   A. Yes
   B. No
   C. I think so
   D. I don't think so

Please do not write your name on this page.

6. What is your approximate grade point average? _____

7. EDUCATIONAL DATA: Are you a high school graduate?

   A. Yes
   A.1 What Year _____
   B. No
   B.1 Highest Grade _____

8. From what type of high school did you graduate?

   A. Michigan public
   B. Michigan private
   C. Other public
   D. Other private

9. PARENTS EDUCATION: What is the level of your parent's education?

9.1 FATHER: A. Grade School B. High School C. Vocational D. College

9.2 MOTHER: A. Grade School B. High School C. Vocational D. College

10. TEACHING EXPERIENCE: A. None
    B. Yes
    B.1 Number of years _____

11. Are you married? A. Yes
    B. No
    C. Divorced

12. Do you have children?
    A. No
    B. Yes
    B.1 How many _____

13. Have you served in the armed forces?
    A. Yes
    B. No

14. Are you on a scholarship or fellowship?
    A. Yes
    B. No
    C. Government loan

15. Have you ever had another Audiovisual Education course?
    A. No
    B. Yes
    B.1 When? _____
    B.2 Where? _____

Please do not write your name on this page.

16. If you are an undergraduate, do you plan to attend graduate school?

    A. Yes A.1 Near Future A.2 Sometime in Future
    B. No
    C. I don't know

17. Are you an Education major?

    A. Yes
    B. No
       B.1 What Major _____

18. If you are an education major, what is your area of specialization?

    A. Elementary Education
    B. Secondary Education
       B.1 Subject Area (art, English, etc.)
       _____
    C. Educational Administration
    D. School Librarian

    _____

ESSAY QUESTIONS: (Please use back of page if necessary)

19. Why did you enroll in this course? (one paragraph)

20. What do you think should be the objectives of this course? (Please list with most important being first)

THANK YOU

SAMPLE TEED 548 COURSE EVALUATION QUESTIONNAIRE*

PLEASE DO NOT WRITE YOUR NAME ON THIS QUESTIONNAIRE

DIRECTIONS: This questionnaire in no way affects your grade in the course. Read each question thoroughly before answering. Based on your experiences in TEED 548 (large group presentation, small group activities, and/or individual study) mark one of the spaces that most nearly represents your feelings. If a statement accurately describes your feelings mark the middle space (number 2, 5, 8) to the left of the statement. If you feel that the most accurate statement is below what is described, mark the lower numbered space; if above, mark the higher numbered space. In any case mark only one space.

- -

1 2 3 I do not feel that I can perform the above stated activity.

4 5 6 I feel that I can perform the above stated activity.

7 8 9 I believe that I cannot only perform the above stated activity but can do so with expertise.

- -

1. Identify several communication models and be able to discuss the primary functions of those models presented in class as they relate to the teaching learning process.

2. Demonstrate ability to operate and describe the operational principles of audiovisual equipment (hardware) made available in the laboratory and classroom.

3. Produce simple audiovisual materials and be able to describe the process and principles involved.

4. Relate the potential capabilities of audiovisual (mediated instruction) within the framework of a communication model discussed in class.

5. Develop effective procedures to use various types of audiovisual materials which takes the total learning environment of the classroom into account.

---

*Written by David W. Hessler and Jay C. Smith, Western Michigan University, Summer 1970.

- -

1 2 3 I do not feel that I can perform the above stated activity.

4 5 6 I feel that I can perform the above stated activity.

7 8 9 I believe that I cannot only perform the above stated activity but can do so with expertise.

- -

6. Develop an awareness of good teaching attributes including effective interpersonal communication.

7. Evaluate the audiovisual program of some school, school system or other unit from the standpoint of the student and the teacher from criteria discussed in class.

8. Identify the names of individuals responsible for some common communication models discussed in class and provided on handouts and separate these names from a list which would include other unrelated names.

9. Select a single communication model from those discussed or given as a handout and be able to reproduce the model without consulting notes or other aids. The reproduction would include the pattern and the labels properly positioned.

10. From the model above be able to list several variables associated with each of the major components (or elements) of the communication model.

11. From the communication model selected, be able to discuss in written form how each of the elements (variables) in the model might affect your decision to use or not to use a particular type of audiovisual media.

12. Given a detailed description of a situation in which audiovisual media is used, be able to recognize all of the examples of "noise" in the channel(s) and suggest at least one way to correct or eliminate the noise in each example identified.

13. Without aids, be able to reproduce the entire Abedor (with minor modifications by Hessler) Model. Select a message design problem of your own and explain how this model with its various functions and steps leads you to a solution.

- -

1 2 3 I do not feel that I can perform the above stated activity.

4 5 6 I feel that I can perform the above stated activity.

7 8 9 I believe that I cannot only perform the above stated activity but can do so with expertise.

- -

14. In your own words, be able to define the type of model used in TEED 548 and explain its utility to the individual using audiovisual media.

15. On a written examination, differentiate the terms audiovisual media; instructional media; audiovisual materials; hardware; software; print media; non-print media with regard to their scope, duplication of meaning, and differences in meaning. Cite examples of items which might be included within the definition of each term.

16. From the code dimensions suggested by Krampen, list four code divisions which suggest the channels available in audiovisual communication. List two examples (or be able to identify two) of audiovisual materials for each of the channels within the code divisions you were able to identify.

17. Prepare a written explanation of Dale's Cone of Experience and describe the most common interpretation as to what the Cone represents.

18. Given two types of communication stimuli (signs) explicate the difference between signals and symbols and identify the given signs as to whether they are signals or symbols.

19. Given the terms dennotative, connotative, and referent, define each and explain their differences and their relationship to communication signals.

20. Describe how signs are related to other things within each domain (Morris Semiotics) and cite examples of how each sign relationship is taken into account by the person using audiovisual materials in the classroom.

21. Describe the different forms which are commonly associated with 8mm motion pictures used in schools and cite a major advantage for each form.

- -

1 2 3 I do not feel that I can perform the above stated activity.

4 5 6 I feel that I can perform the above stated activity.

7 8 9 I believe that I cannot only perform the above stated activity but can do so with expertise.

- -

22. Write your reasons for supporting or not supporting the following statement: Technological advancements related to 8mm forms, processes, and equipment indicated the decline of 16mm equipment and materials in our schools and universities.

23. List the basic functions of any camera with adjustments which correspond with the functions of the lens, iris, retina and eyelid of the eye.

24. List two major advantages of a single-lens reflex camera especially related to closeup or telephoto applications.

25. From a list of different types of 35mm films, match the film type to the type of end product, e.g., slides and to the type of shooting situation, e.g., photofloods, electronic flash, common household (tungsten) lighting.

26. From the following list of basic terms be able to define them in your own words: depth-of-field; f number, shutter speeds; ASA number; light motor and its function; parallax; high contrast photography; closeup lenses, 45 degree lighting; animation and focal length.

27. Explain why Mr. Hessler was so enthusiastic about the use of the Kodak Visualmaker as a potential teaching tool in most schools and describe at least two major disadvantages of the device when compared with an SLR camera with a copystand and lights.

28. Explain how syntax for the printed word and visual symbols (e.g. pictures) differs.

29. From the Morris Model of Semiotics, (i.e., the study of message systems) describe the importance of each of the sign relationships within the domains shown in the model (i.e., syntactics, semantics, pragmatics) and illustrate how you as a communicator would consider these sign relationships when putting together a series of slides for some specific purpose.

- -

1 2 3 I do not feel that I can perform the above stated activity.

4 5 6 I feel that I can perform the above stated activity.

7 8 9 I believe that I cannot only perform the above stated activity but can do so with expertise.

- -

30. Visual literacy is a common term associated with the "language" of visuals. Explain the reasons for the high interest in visual literacy (cite at least two major reasons).

31. Reproduce the Abedor-Hessler Model for designing messages as a crude sketch with all the major functions listed and describe where (i.e. function) each of the following considerations would be dealt with: Your specific classroom; planning board technique; budget; type of camera available; etc.

32. Contrast the advantages and disadvantages (at least three) of a series of slides and a filmstrip.

33. Be able to list the two basic sizes of field coverage (area photographed) of the Ektagraphic Visualmaker and discuss a technique for controlling exposure of bright visuals.

34. Identify at least three types of functions which can be performed with the Repronar or Illumitran.

35. Identify a couple of advantages of the filmstrip viewer shown in class.

36. From a list of alternatives identify at least five major criteria to consider in purchasing a camera for school use.

37. With a given film in the camera identify the two functions of the more advanced camera with control the exposure of the photographic image.

38. High contrast slides offer some rather unique utilization techniques. Identify these slides from a list of alternatives.

39. Photography provides one of the best avenues toward individualizing much of the content in many courses, explain. What are the cautions in too much self-instruction activity in a course.

PART TWO:

DIRECTIONS: Read each question thoroughly before answering. Mark the degree to which your opinion coincides with the statement given.

1. Agree
2. Tend to Agree
3. Neutral
4. Tend to Disagree
5. Disagree

DISCUSSIONS OF COMMUNICATION MODELS (Berlo, etc.):

40. motivated study

41. presented new materials

42. reinforced learning

43. redundant

44. were related to practical teaching needs

45. required time and work in excess of worth gained

DISCUSSIONS OF DESIGN MODELS (Abedor-Hessler, etc.)

46. motivated study

47. presented new materials

48. reinforced learning

49. redundant

50. were related to practical teaching needs

51. required time and work in excess of worth gained

DISCUSSIONS OF MESSAGE ANALYSIS (signs, semiotics, ect.)

52. motivated study

53. presented new materials

54. reinforced learning

55. redundant

56. were related to practical teaching needs

57. required time and work in excess of worth gained

- -

1. Agree
2. Tend to Agree
3. Neutral
4. Tend to Disagree
5. Disagree

- -

DISCUSSIONS OF STUDENT OBJECTIVES:

58. motivated study

59. presented new materials

60. reinforced learning

61. redundant

62. were related to practical teaching needs

63. required time and work in excess of worth gained

DISCUSSIONS OF MATERIALS/RESOURCES:

64. motivated study

65. presented new materials

66. reinforced learning

67. redundant

68. were related to practical teaching needs

69. required time and work in excess of worth gained

DISCUSSIONS OF VISUAL MODELS (Transpariencies, Films, Visualmaker, etc.)

70. motivated study

71. presented new materials

72. reinforced learning

73. redundant

74. were related to practical teaching needs

75. required time and work in excess of worth gained

- -

1. Agree
2. Tend to Agree
3. Neutral
4. Tend to Disagree
5. Disagree

- -

76. Are you:
    1. Male
    2. Female

77. Are you:
    1. an undergraduate
    2. graduate

78. Have you:
    1. Never taught but plan to teach
    2. do not plan to teach
    3. taught 0-- 3 years
    4. taught 4-- 6 years
    5. taught 7--10 years
    6. taught 10--15 years
    7. over 15 years

79. Are you:
    1. a lower elementary teacher (K-3)
    2. a middle elementary teacher (4-6)
    3. a middle school teacher (7-9)
    4. a secondary teacher (10-12)
    5. an elementary school librarian
    6. a secondary school librarian
    7. a school administrator
    8. not a teacher

80. How much do <u>you</u> think you have learned from this course?
    1. nothing
    2. some but not much
    3. about what I expected
    4. more than I expected
    5. much more than I expected
    6. one of the best courses I have had

APPENDIX E

STATISTICAL DATA

Group 1	Research Treatment A			
(n=29) Subject "unique" #	Pretest NEMA*	Posttest NEMA	Pretest COG.**	Posttest COG.
0141	71	46	15	24
1051	64	47	29	36
1111	59	49	19	27
1131	55	40	24	29
1141	68	42	20	30
1221	58	63	21	27
2211	52	58	17	26
2301	72	42	17	29
2321	45	53	23	31
2471	56	43	22	29
3141	40	35	20	29
3661	72	56	22	27
3761	66	57	20	28
4131	51	52	21	24
4961	36	38	16	26
5501	62	35	22	29
5561	61	47	23	31
6061	77	65	25	29
6141	63	62	24	36
6201	48	40	17	34
6281	52	40	15	26
7071	58	42	20	30
7211	44	39	22	31
7461	60	59	16	28
8281	61	48	22	33
8461	61	48	24	30
9141	59	52	23	30
9161	52	47	20	26
9611	60	49	17	27

*New Educational Media Attitude inventory; low score indicates positive attitude.

**Cognitive test, A Test for Audiovisual Media.

Group 2	Research Treatment B			
(n=24) Subject "unique" #	Pretest NEMA*	Posttest NEMA	Pretest COG.**	Posttest COG.
1102	95	53	22	29
1222	60	46	22	28
1382	50	33	20	25
1462	58	33	18	33
2032	40	32	23	30
2442	66	33	18	24
2882	58	45	18	30
3742	64	46	15	19
4182	49	45	18	34
4192	75	38	20	32
4202	59	54	23	30
5912	41	36	21	32
5922	58	43	23	29
6192	39	32	21	28
6282	72	50	17	24
6432	47	36	20	29
6462	56	37	26	32
7002	74	65	22	31
7102	55	44	19	31
7952	57	43	25	31
8292	49	51	26	31
8462	70	47	19	24
8572	45	36	18	31
9442	80	39	18	29

*New Educational Media Attitude inventory; low score indicates positive attitude.

**Cognitive test, A Test for Audiovisual Media.

Group 3	Research Treatment C			
(n=29) Subject "unique" #	Pretest NEMA*	Posttest NEMA	Pretest COG.**	Posttest COG.
0043	38	44	18	22
0933	72	59	24	31
1013	56	54	20	32
1243	66	51	21	23
1283	61	46	23	29
1663	61	46	16	23
2213	63	59	22	22
2323	53	43	26	33
2583	48	40	16	23
3623	57	67	21	27
3903	55	69	21	21
4213	67	58	24	28
4233	58	46	17	22
4603	57	48	29	36
4943	71	59	19	24
5453	81	63	19	22
5463	58	56	12	22
5473	58	53	17	28
6443	43	36	25	29
6543	55	50	26	28
6563	38	34	22	30
6643	46	45	16	22
7103	49	61	24	28
7703	89	52	15	18
7953	35	49	15	22
8163	51	44	19	27
8293	78	74	16	27
8863	41	44	20	25
9283	40	67	18	26

*New Educational Media Attitude inventory; low score indicates positive attitude.

**Cognitive test, A Test for Audiovisual Media.

MULTIVARIATE ANALYSIS OF VARIANCE

PROGRAMMED BY JEREMY FINN

STATE UNIVERSITY OF NEW YORK AT BUFFALO

--PROBLEM--

ANALYSIS OF COVARIANCE JAY SMITH

CELL IDENTIFICATION AND FREQUENCIES

CELL*	GROUPS	FACTOR LEVELS									N
1	1	1	0	0	0	0	0	0	0	0	29
2	2	0	0	0	0	0	0	0	0	0	24
3	3	0	0	0	0	0	0	0	0	0	29

TOTAL N= 82

ANALYSIS OF COVARIANCE JAY SMITH

CELL MEANS --- ROWS ARE CELLS COLUMNS ARE VARIABLES

	1 NEMPRE	2 NEMPOS	3 COGPRE	4 COGPOS
1*	58.03448	48.06897	20.55172	29.03448
2	59.04167	42.37500	21.50000	29.00000
3	56.72414	52.31034	20.03448	25.86207

COMBINED MEANS

VARIABLE	VARIANCE	STANDARD DEVIATION
1 NEMPRE	151.262240	12.2989
2 NEMPOS	81.186000	9.0103
3 COGPRE	12.128320	3.4826
4 COGPOS	13.144478	3.6255

D.F.= 79

* Cell 1 = Research Treatment Group A
  Cell 2 = Research Treatment Group B
  Cell 3 = Research Treatment Group C

STATISTICS FOR REGRESSION ANALYSIS WITH 2 COVARIATES

	VARIABLE	SQUARE MULT R	MULT R	F	P LESS THAN	STEP DOWN F	P LESS THAN
1	NEMPOS	0.2256	0.4749	11.2127	0.0001	11.2127	0.0001
2	COGPOS	0.3963	0.6295	25.2763	0.0001	24.9443	0.0001

DEGREES OF FREEDOM FOR HYPOTHESIS= 2
DEGREES OF FREEDOM FOR ERROR= 77

CHI SQUARE FOR TEST OF HYPOTHESIS OF NO ASSOCIATION BETWEEN DEPENDENT AND INDEPENDENT VARIABLES= 58.1604

D.F.= 4 P LESS THAN 0.0001

ANALYSIS OF COVARIANCE JAY SMITH

F-RATIO FOR MULTIVARIATE TEST OF EQUALITY OF MEAN VECTORS= 9.2507

D.F.= 4 AND 152.0000 P LESS THAN 0.0001

	VARIABLE	BETWEEN MEAN SQ	UNIVARIATE F	P LESS THAN	STEP DOWN F	P LESS THAN
1	NEMPOS	760.3144	11.7864	0.0001	11.7864	0.0001
2	COGPOS	78.1718	9.6062	0.0002	6.9824	0.0017

DEGREES OF FREEDOM FOR HYPOTHESIS= 2
DEGREES OF FREEDOM FOR ERROR= 77

2 COVARIATES HAVE BEEN ELIMINATED

CORE USED FOR DATA= 112

Incidental or Post-Hoc Comparisons in Data[1]

There are a number of methods that have been devised for testing the significance of post-hoc comparisons, only one of which will be given here. This is the method due to Scheffé (1959), which has advantages of simplicity, applicability to groups of unequal sizes, and suitability for any comparison. This method is also known to be relatively insensitive to departures from normality and homogeneity of variance. The Scheffé method is emphasized here because of its simplicity and versatility over a wide variety of situations.

Given any comparison g made on the data after a significant F has been found for the relevant factor, the significance of the comparison value Φ, may be found by use of the following confidence interval:

where $$\Phi g - S\sqrt{V(\Phi g)} \leq \Phi g \leq \Phi g + S\sqrt{V(\Phi g)}$$

$$\sqrt{V(\Phi g)} = \sqrt{(\text{MS error})\omega g} = \sqrt{\text{est. var.}(\Phi)}$$

and $$S = \sqrt{(J - 1)Fa.}$$

---

[1]William L. Hays, Statistics (New York: Holt, Rinehart and Winston, 1963), pp. 483-485.

APPENDIX F

MAJOR GENERALIZATIONS: STUDENT RATINGS OF TEACHERS

MAJOR GENERALIZATIONS: STUDENT RATINGS OF TEACHERS[1]

(1) Reliability of ratings of teachers by students is a function of the number of raters, in accordance with the Spearman-Brown prophecy formula (Shock, Kelly, and Remmers, 1927). If twenty-five or more student ratings are averaged, they are as reliable as the better educational and mental tests at present available (Remmers, 1960).

(2) Grades of students have little if any relationship to their ratings of instructors who assigned the grades (Elliott, 1950; Remmers, 1928, 1930).

(3) Alumni 10 years after graduation agree very closely (rank orders rho=.92) with on-campus students on the relative importance of 10 teacher characteristics (Drucker and Remmers, 1950).

(4) Alumni 10 years after graduation agree substantially (rs ranging from .40 to .68) with on-campus students in their average ratings of the same instructors (Drucker and Remmers, 1950).

(5) Halo effect, if present in ratings by such instruments as the Purdue Rating Scale for Instruction, is insufficient to raise the intertrait correlations to unity when corrected for unreliability of the ratings. Evidence indicates that students discriminate reliable among different aspects of the teacher's personality and of the course (Remmers, 1934).

(6) Little if any relationship exists between students' ratings of the teacher and the difficulty of the course (Remmers, 1928).

(7) In a given college or university, wide and important departmental differences in teaching effectiveness may exist as judged by student opinion (Remmers, 1928).

(8) The sex of student raters bears little or no relationship to their rating of teachers (Remmers, 1929).

(9) The cost in time and money of obtaining student ratings of teachers is low. In fact, it is considerably lower than the cost of administering a typical standardized educational test of some comprehensiveness (Remmers, 1960).

---

[1] H. H. Remmers, "Rating Methods in Research on Teaching," in Handbook of Research on Teaching, ed. by N. L. Gage (Chicago: Rand McNally and Company, 1963), pp. 367-368.

(10) Popularity in extra class activities of the teacher is probably not appreciably related to student ratings of that teacher (Remmers, 1928, 1960).

(11) Teachers with less than five years' experience tend to be rated lower than teachers with more than eight years' experience (Remmers, 1929).

(12) The sex of the teacher is in general unrelated to the ratings received (Remmers, 1929).

(13) There is a low but significant positive relationship (r=.20) between the mean objectively measured achievement of an instructor's students (with scholastic ability held constant) and students' ratings of college chemistry teachers (Elliott, 1950).

(14) Students are more favorable than instructors to student ratings of instructors, but more instructors than students have noticed improvement in their teaching as a result of student ratings (Remmers, 1960).

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APPENDIX G

DATRIX REFERENCE LISTING

DATRIX REFERENCE LISTING

SEARCH NUMBER- 008041 PREPARED FOR- SMITH, JAY 05/20/70

KEYWORDS USED IN SEARCH--

COURSE*, CURRICUL*, PROCEDURE*
AND
STUDENT*
AND
EVALUAT*, RAT*, CHOOSE*, ANALYSIS
AND EXCLUDING THE FOLLOWING KEYWORDS
ELEMENTARY, HIGH

A STUDY OF THE EFFECT OF TEACHING SELF-EVALUATION PROCEDURES ON THE SELF-CONCEPT OF STUDENT TEACHERS*
BRANN, RALPH AUSTIN ED.D. OKLAHOMA STATE UNIVERSITY
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HAWKES, NORMA JEANNE ED.D. UNIVERSITY OF OREGON
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MILLER, GEORGE SHERMON ED.D. WAYNE STATE UNIVERSITY
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AN ANALYSIS OF THE STUDENT TEACHING OPERATION AT BRIGHAM YOUNG UNIVERSITY WITH A PROPOSED HANDBOOK OF POLICIES AND PROCEDURES FOR STUDENT TEACHING AT B.T.U.
PUCKETT, ELDON HARDY ED.D. BRIGHAM YOUNG UNIVERSITY
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