ASSESSING THE EFFECT AND TRANSFER VALUE OF A CLASSROOM SIMULATOR TECHNIQUE

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ABSTRACT

ASSESSING THE EFFECT AND TRANSFER VALUE
OF A CLASSROOM SIMULATOR TECHNIQUE

by Charles W. Vlcek

This study investigated: (1) the effect of a classroom simulator in providing teacher-trainees with experience in identifying and solving classroom problems prior to their student teaching experience; (2) the transfer value of the classroom simulator experience; and (3) the effect of the simulator on teacher-trainee self-confidence in their ability to teach. In addition, the study measured teacher-trainee attitudes toward their classroom simulator experience.

A two factorial design was employed consisting of an experimental and a control group which were selected randomly from a Junior level Elementary Bloc sequence at Michigan State University divided by high and low GPA's. The experimental group received nine hours of classroom simulator experience while the control group received an orientation session only.

Three hypotheses were formulated:

H_1: Subjects receiving classroom simulator experience will identify and react more correctly to representative simulated classroom problems as measured by a post-test, than subjects not receiving classroom simulator experience.

H_2: Subjects receiving classroom simulator experience will identify and react more effectively to actual classroom problems, as measured by an observation criterion instrument during their student teaching assignment, than subjects not receiving classroom simulator experience.

H_3: Subjects receiving classroom simulator experience will exhibit a higher level of confidence in their ability to teach, as measured by a confidence scale, than a group not receiving simulator experience.

A replica of a front section of a sixth grade classroom was constructed. Classroom problems and feedback sequences were projected in sound, motion, and color on a large rear projection screen in "life-like" size. Teacher-trainees physically and verbally responded to each problem presented and immediately observed the class behavior elicited by their response. Problems and feedback sequences were presented repeatedly until the teacher-trainee elicited a desirable response from the class. A guided discovery technique was employed.

Following the instructional phase both groups were given a post-test in the simulator. The first hypothesis was supported. Significant differences were found between the groups on the mean test scores for two out of three divisions of the test. The experimental group was significantly better in coping and being aware of more principles used in handling the simulated classroom problems. No differences were found between the mean scores of the two groups for being aware that problems did exist.

A follow-up study measured the transfer effect of the simulator experience during the teacher-trainee's student teaching experience. Three groups observed the teacher-trainees during student teaching: (1) three trained observers, (2) university coordinators, and (3) classroom supervising teachers. The transfer instrument was divided into the following sections: awareness of problems, response to problems, and application of principles. The second hypothesis did not find adequate support. No significant differences were found by the trained observers between the experimental and control groups on their awareness of problems existing or on their effectiveness in responding to the problems. Significant differences were found in the application of principles used in solving classroom problems. Analysis of the data indicated that both groups applied approximately equal numbers of principles with effective results but the experimental group applied a greater number of principles with ineffective results.

The university coordinators recorded significant differences between the two groups on responding effectively to problems but no differences on awareness of problems and correct application of principles. The classroom supervisors found significant differences on the observational instrument for all three divisions--awareness of problems, response to problems, and application of principles.

The evidence recorded on the confidence scale provided strong support for the third hypothesis that classroom simulator experience increases self-confidence in ability to teach.

Information collected by the attitude scale, "Student Reaction to Simulator Experience," indicated that the participants did feel that classroom simulator experience was worthwhile and helpful.

Conclusions

Several conclusions are made from the findings reported in this experiment.

1. Awareness of classroom problems is not developed through classroom simulator experience. Teacher-trainees apparently possess this ability to identify classroom problems prior to the simulator experience.
2. Effective responses to classroom problems can be developed through classroom simulator experience prior to the teacher-trainee's student teaching assignment.
3. Principles which can be used in solving classroom problems can be developed through classroom

simulator experience prior to the teacher-trainee's student teaching assignment.

4. Experiences gained in responding to problems within the classroom simulator do not transfer to the teacher-trainee's student teaching experience. However, evidence does exist which supports the postulate that experience with more simulated classroom problems increases transfer.
5. Principles developed for application in solving classroom problems do transfer to the teacher-trainee's student teaching experience.
6. Teacher-trainee confidence in ability to teach is increased through classroom simulator experience.

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By

Charles W. Vlcek

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The author particularly wishes to thank Dr. Charles F. Schuller, his committee chairman, whose interest and full cooperation made this study possible and to his committee members, Dr. Colby Lewis, Dr. Donald Olmsted, and Dr. Troy Stearns.

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DEDICATION

This study is dedicated to my wife Evelyn whose love and encouragement made completion of this task possible . . . and to my children, Jeannette, Timothy, and Beverly, who were so understanding.

CHAPTER I

THE PROBLEM

The Need for the Study

One of the many problems faced by teacher educators today is providing adequate classroom experiences for future teachers. Teacher trainees are provided with a variety of books and reference materials to study. They are provided with opportunities to discuss problems encountered daily by teachers in classrooms. They are given opportunities to hear experienced teachers describe and explain teaching pedagogy through lectures, demonstrations, films, and other media. However, after all this preparation, many teacher-trainees have difficulty transferring their newly acquired knowledge into practice during student teaching and first year teaching assignments. They make mistakes, they misinterpret, and they lose rapport with their students.

Several explanations are given for this difficulty. First, student teachers do not receive adequate guidance by their already overburdened classroom supervising teachers. Secondly, student teachers are in the uncomfortable position of trying to satisfy both their supervising teacher and university coordinating teacher, which does not provide an atmosphere conducive to a maximum learning experience. Another reason for difficulty is that student teachers are not given an opportunity to experiment with different teaching techniques and methods of solving classroom problems.

Experiences should be provided ideally so that teacher-trainees can practice their newly acquired teaching behaviors privately before facing a real class. Teacher-trainees should be given the opportunity of being baited or tested by students, and experiencing how students will react to various situations. By carefully supervising and controlling these experiences; by removing student teachers from the uncomfortable position between university co-ordinating teachers and classroom supervising teachers; by allowing student teachers to try different techniques; prospective teachers can then discover and develop classroom behaviors and prepare themselves for that "real" classroom prior to their student teaching assignment.

The Purpose of the Study

The purpose of this study is to determine if teacher-trainees can discover and develop desirable teaching behaviors based upon previously taught basic principles of learning and teaching through a classroom simulator experience. If these newly discovered and developed desirable teaching behaviors then transfer from the simulator experience into actual field practice and the teacher-trainee's confidence in his ability to teach can be increased through classroom simulator experience, then a truly valuable technique will have been created to help solve the problem of providing teacher-trainees with more classroom experience before they reach the classroom as student teachers and teachers.

The Hypotheses

The effectiveness of using a classroom simulator technique in providing classroom experiences for elementary teacher-trainees will be determined by testing three hypotheses:[1]

1. A positive relationship exists between classroom simulator experience and a teacher-trainee's ability to identify and react to representative simulated classroom problems.

2. A positive relationship exists between classroom simulator experience and a teacher-trainee's ability to identify and cope with representative classroom problems during student teaching assignments.

3. A positive relationship exists between classroom simulator experience and a teacher-trainee's confidence in his ability to teach.

Theory Underlying the Study

During the past 60 years much research has taken place which has attempted to clarify what happens during the learning process. However, this research has not

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[1]These hypotheses are restated in testable form in Chapter III.

provided the educator with concrete theories upon which to base learning activities.

H. H. Remmer stated in a 1953 report:

> The simple fact of the matter is that, after 40 years of research on teacher effectiveness during which a vast number of studies have been carried out, one can point to few outcomes that a superintendent of schools can safely employ in hiring a teacher or granting him tenure, that an agency can employ in certifying teachers or that a teacher education faculty can employ in planning or improving teacher education programs.[2]

Gagne and Bolles have also recognized that research has not yielded meaningful and measurable criteria upon which educators can rely:

> From the very amount of research that has been done on human learning much is known about the conditions that influence learning, and many of the variables that govern learning have now been identified. It is somewhat surprising that in spite of this body of information, relatively little of a systematic nature is known about how to promote efficient learning in practical situations.[3]

Many reasons are given as causes for this deplorable state. The studies attempt to isolate and vary single bits of stimulus materials to determine the effect of these variations on the learning process. They tend to involve

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[2]H. H. Remmer, et al., "Second Report of the Committee on Criteria of Teacher Effectiveness," Journal of Educational Research, Vol. 46 (May, 1953), p. 657.

[3]Robert M. Gagne and Robert C. Bolles, "A Review of Factors In Learning Efficiency," Automatic Teaching: The State of the Art, E. H. Galenter, editor (New York: John Wiley and Sons, 1959), p. 13.

[4]Ibid.

rather restricted stimuli far removed from the types of materials which are of practical importance.[4] The result is a collection of data so attenuated, so far removed from the sight, sound, smell, feel, and sense of the classroom that the reality has escaped and the data collected is no longer representative of the real classroom.

Many studies proceed without any explicit theoretical framework for developing rationalized and testable hypotheses.[5] Many of the theoretical frameworks from which many research studies have been organized do not have any immediate or worthwhile practical application. The researcher is concerned with how the learning process functions and not with how to implement learning.

The studies undertaken do not interact and build upon one another.[6] There is little replication of studies duplicating all dependent and independent variables. Each researcher feels a responsibility to solve new problems instead of adding to and validating findings of other researchers.

Still another limiting factor in the usefulness of the compiled volumes of research are contradictory findings about the same phenomena. One does not need to search through the literature extensively before finding research support for a variety of viewpoints.

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[5] _Ibid._

[6] Remmer, _et al._, _loc. cit._

For these reasons, past research has not been able to provide educators with a unified and organized pool of knowledge about the learning process from which teaching methods can be premised.

While Gagne and Bolles[7] dramatize the shortcomings of research many of the quarrels are internal and are not very important. There are a great many scattered, practical and important experimental relationships upon which researchers are in substantial agreement. It is from these practical and important relationships which research evidence does tend to support that this study obtains its theoretical framework.

There are eight theoretical elements or parts of learning theories upon which researchers are in general agreement and upon which this study is based. They are: (1) the role of feedback in learning; (2) the value of laboratory or actual experience in learning; (3) learning by principles; (4) learning through problem solving; (5) learning through discovery; (6) the transfer of learning; (7) stimulus generalization; and (8) the role of self-concept to learning. Each of these theoretical elements will be developed separately and summarized at the end of this section.

Researchers are in general agreement that reinforcement is important in learning. Research evidence indicates

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[7]Gagne and Bolles, loc. cit.

that feedback or knowledge of results is important in the learning process. The list of authorities who support this view is formidable.[8] A typical example of the attitude of educational psychologists is taken from Wolfle:

> Laboratory studies are unequivocal in emphasizing the importance of giving a subject as specific and as immediate imformation as possible concerning the outcome of his efforts.[9]

Other researchers who take this same viewpoint are Angel and Troyer,[10] Gagne and Bolles,[11] Miller,[12] Smith and Van Ormer,[13] and many others.

Immediate feedback is frequently cited as being one of the requirements not only necessary to shape a learner's

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[8] R. B. Ammons, "Effects of Knowledge of Performance: A Survey and Tentative Theoretical Formulation," Journal of General Psychology, Vol. 54 (1956), p. 283.

[9] Duel Wolfle, "Training," Handbook of Experimental Psychology, S. S. Stevens, editor (New York: John Wiley and Sons, Inc., 1951), p. 1267.

[10] G. W. Angel and M. E. Troyer, "A New Self-Scoring Test Device for Improving Instruction," School and Society, Vol, 67 (January 31, 1948), p. 84.

[11] Gagne and Bolles, op. cit.

[12] R. B. Miller, Psychological Considerations for the Design of Training Equipment (Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, December, 1954).

[13] K. R. Smith and E. B. Van Ormer, Learning Theories and Instructional Film Research (Special Devices Center, Office of Naval Research, Port Washington, New York, June, 1949).

behavior but to maintain it's strength.[14] Woodworth and Scholosberg find that if students are to learn skills, they must practice skills and see the results of their practice.[15]

In other words, some means must be provided for the learner to perceive the results of his activity. The learner must receive from the learning environment some feedback which will enable him to realize that his performance is correct. This does not mean that the learner must always be specifically told that he is correct. Sometimes he knows he is correct just by observing the results of his behavior or actions.[16]

In summary, research evidence tends to support the theory that immediate knowledge of results is important in the learning process. The learner need not always be told that he is correct; he will know by observing the results of his behavior.

Another area of agreement involves laboratory experience. The laboratory method of teaching assumes that first-hand experience and manipulation of materials or

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[14]Douglas Porter, "Teaching Machines," Teaching Machines and Programmed Learning, A. A. Lumsdaine and R. Glaser, editors (Washington: National Educational Association, 1960), p. 206.

[15]R. S. Woodworth and H. Schlosberg, Experimental Psychology (revised edition; New York: Henry Holt and Company, 1954).

[16]Robert M. Gagne, The Conditions of Learning (New York: Holt, Rinehardt and Winston, Inc., 1965), p. 225.

events is necessary for learning certain concepts and skills. The premise is that sensorimotor experiences aid in the learning process. McKeachie states that from the standpoint of theory, the activity of the student, the sensorimotor nature of the experience, and the individualization of laboratory instruction should contribute positively to learning.[17]

However, McKeachie cautions that one would not expect laboratory teaching to have an advantage over other teaching methods in amount of information learned. Rather we might expect the differences to be revealed in retention and ability to apply learning or skills.[18]

Deductive learning by the application of principles is another widely accepted generalization. Wallen and Traverse include this generalization as one of their six principles of learning:

> Practice in applying a principle to the solution of problems will increase the probability of transfer of training to new problems which require the use of the same principle for their solution.[19]

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[17]W. J. McKeachie, "Research on Teaching at the College and University Level," Handbook of Research on Teaching, N. L. Gage, editor (Chicago: Rand McNally and Company, 1963), p. 1144.

[18]*Ibid.*

[19]Norman E. Wallen and Robert M. W. Traverse, "Analysis and Investigation of Teaching Methods," Handbook of Research on Teaching, N. L. Gage, editor (Chicago: Rand McNally and Company, 1963), p. 497.

However, certain conditions must be met before a principle can be applied to the solution of a problem. A principle is a chain of two or more concepts. Accordingly, for a principle to be understood, the concepts to be linked must have been previously learned.[20] This places principle formation on a higher level than concepts, and these concepts must be learned before the principles can be developed and learned.

Concepts and principles show marked resistance to forgetting and are retained longer with little loss over periods of months and years as compared with forgetting of the simpler forms of learned capacities such as chains and multiple discriminations.[21] Katona demonstrates in a study that learners who learned simple verbal statements of principles forgot most of them within a month, whereas those who learned the principles themselves and could demonstrate them showed almost perfect retention after the same time interval.[22]

Research provides evidence therefore, that learning principles not only produces a capacity to understand

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[20]Gagne, op. cit., p. 52.

[21]D. P. Ausubel, The Psychology of Meaningful Verbal Learning (New York: Grune and Stratton, 1963), p. 44.

[22]G. Katona, Organizing and Memorizing (New York: Columbia University Press, 1940).

and use information but it is also well retained for a relatively long period of time.

There is some evidence, though not conclusive, that problem solving is a valuable method of learning. Gagne lists problem solving as one of his eight types of learning:

> The evidence strongly suggests that achieving a higher-order principle by means of problem solving produces a highly effective capability which is well retained over considerable periods of time.[23]

With transfer of learning as the criterion, most studies involving problem-solving find that a variety of problems produce the best performance if each of the problems are learned to a moderate degree.[24, 25, 26] Through the application of principles in solving a variety of problems, solutions become generalizable to other similar problems. However, these solutions generalize to similar problems only if they have been learned.

Another variable in training which affects problem solving, transfer, and concept learning involves the use

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[23]Gagne, op. cit., p. 164.

[24]M. F. Callantine and J. M. Warren, "Learning Sets in Human Concept Formation," Psychological Report, Vol. 1 (1955), p. 363.

[25]K. E. Lloyd, "Supplementary Report: Retention and Transfer of Responses to Stimulus Classes," Journal of Experimental Psychology, Vol. 59 (1960), p. 207.

[26]C. P. Duncan, "Recent Research on Human Problem Solving," Psychological Bulletin, Vol. 56 (1959), p. 397.

of overt verbalization by the subject while he is solving problems. There is a wealth of support from the literature on verbal mediation and concept learning to indicate that language is an important independent variable.[27, 28] Rephrasing or summarizing one's solution to a problem or conclusions does aid in the learning process.

Gagne and Smith, in a study on problem solving, required one group of ninth and tenth grade boys to verbalize by stating a principle used during instruction while requiring another group not to verbalize.[29] They summarized their results as follows:

> The results appear to indicate that requiring S's to verbalize during practice has the effect of making them think of new reasons for their moves, and thus facilitates both the discovery of general principles and their employment in solving successive problems.[30]

Still another theoretical element upon which this study is based is the value of discovery in the learning

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[27]Katherine Norcross and C. C. Spiker, "Effects of Mediated Associations on Transfer in Paired-Associate Learning," Journal of Experimental Psychology, Vol. 55 (1958), p. 129.

[28]C. N. Cofer, "Experimental Studies of the Role of Verbal Processes in Concept Formation and Problem-Solving," Fundamentals of Psychology: The Psychology of Thinking, E. Harms, editor (New York Academy of Science, Vol. 91, 1960), p. 94.

[29]R. M. Gagne and E. C. Smith, Jr., "A Study of the Effects of Verbalization of Problem Solving," Journal of Experimental Psychology, Vol. 63 (1962), pp. 12-18.

[30]Ibid., p. 18.

process. Discovery as a learning technique is a relatively new area for research but many studies provide evidence that the discovery method is effective.[31, 32, 33]

Anderson found that the discovery method may reduce recall of specific information and knowledge but may increase transfer of principles to new examples.[34] Evidence also indicates that guided discovery may be more effective than pure discovery.[35, 36, 37]

Craig, in summarizing his study on guided discovery, interprets his study as one which indicates that guidance or "external direction" can help learners make future

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[31]G. Katona, op. cit.

[32]G. L. Anderson, "Quantitative Thinking As Developed Under Connectionist and Field Theories of Learning," Learning Theory in School Situations (Minneapolis: University of Minnesota Press, 1949), pp. 40-73.

[33]C. L. Stacey, "The Law of Effect in Retained Situations With Meaningful Material," Learning Theory in School Situations (Minneapolis: University of Minnesota Press, 1949), pp. 74-103.

[34]Anderson, op. cit., p. 41.

[35]R. C. Craig, "Directed Versus Independent Discovery of Established Relations," Journal of Educational Psychology, Vol. 47 (1956), pp. 223-234.

[36]B. R. Corman, "The Effect of Varying Amounts and Kinds of Information As Guidance in Problem Solving," Psychology Monograph, Vol. 71 (1957), pp. 1-21.

[37]J. E. Kittell, "An Experimental Study of the Effect of External Direction During Learning in Transfer and Retention of Principles," Journal of Educational Psychology, Vol. 48 (1957), pp. 391-405.

discoveries by providing them with an adequate background of information.

> Many have advocated relatively independent problem-solving in the belief that learning situations should be similar to anticipated transfer situations. This point of view rests on the assumption that future discovery of principles will be through independent problem-solving, hence, more like pupil self-discovery than directed discovery. A different view is that problem-solving and discovery are never independent except in the sense that no one is physically present to prompt the learner. Principles previously learned in an area serve to direct discovery. Out-of-school discovery is not independent but directed by the knowledge gained under the direction of previous teachers. The more direction of this kind available to the learner, the more effective his discovery of new relations. The cumulative effect of greater learning through directed discovery over months or years may offset and transfer to situations and prove to be the best preparation for new discoveries.[38]

On the other hand, there is evidence contrary to guided discovery. Hendrix found support for his postulate that independently derived principles are more transferable than given principles.[39] Kersh indicates in a recent study that assistance in discovering principles may lead to better understanding, but when the principle is discovered without aid it is better assimulated and remembered.[40]

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[38] R. C. Craig, op. cit., p. 233.

[39] C. Hendrix, "A New Clue to Transfer of Training," Elementary School Journal, Vol. 48 (1947), pp. 197-208.

[40] B. Y. Kersh, "The Adequacy of 'Meaning' as an Explanation for the Superiority of Learning by Independent Discovery," Journal of Educational Psychology, Vol. 49 (1958), pp. 282-292.

The effect of guidance is to speed up learning, since the learner does not waste time on discovering principles which are wildly wrong. Guidance also lowers the learner's anxiety level. A high anxiety level tends to interfere or reduce learning. Even though the learner is guided, if he actively generates the principles himself, the discovery technique should result in more effective learning.

Wittrock, after reviewing the research on discovery, answers the question: as of the present, what does empirical research on discovery learning imply for teaching by discovery?

> It seems that some type of carefully sequenced, guided discovery is a sound compromise and combination from the realms of motivation, efficiency, and transfer within concepts. In terms of the results from the empirical research, the curriculum projects which present carefully sequenced and hierarchically organized material and which require the learner to verbalize his own generalizations are defensible because they retain the feeling of self-discovery and combine it with an efficient programmed direction aimed at transfer.[41]

The sixth element of theory which this study will be based upon is stimulus generalization. Thorndike and Woodworth began the development of stimulus generalization

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[41] M. C. Wittrock, The Learning By Discovery Hypothesis, A paper prepared for the Conference on Learning by Discovery, New York City, January 28-29, 1965 (California: Stanford University, 1965), p. 61.

theory as a result of their experiments in 1901.[42] They concluded "The spread of practice (transfer) occurs only where identical elements are concerned in the influencing and influenced functions."[43] A second theory maintained by Judd, and related to stimulus generalization, is generalization of experience.[44]

Sorenson agrees with these two theories to explain transfer of training. He states:

> The principle of identical elements involves specificity and perception. The transfer depends on the extent to which specific elements exist common to each situation and the degree to which they are perceived. The principle of generalization, on the other hand, is conceptual in nature. Transfer depends on possessing a concept or idea and being able to apply it in another situation.[45]

There is a great deal of experimental evidence and very little disagreement that positive transfer increases with the degree of similarity or identical elements of the internally-learned task to the final task.[46, 47] The

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[42]E. L. Thorndike, Educational Psychology, Vol. II, The Psychology of Learning (New York: Teachers College, Columbia University, 1923), p. 452.

[43]Ibid.

[44]C. H. Judd, Psychology of Secondary Education (Boston: Ginn and Company, 1927), p. 545.

[45]Herbert Sorenson, Psychology in Education (New York: McGraw-Hill Book Company, 1940), p. 385.

[46]C. I. Hovland, "Human Learning and Retention," Handbook of Experiment Research, S. S. Stevens, editor (New York: Wiley, 1951), p. 613.

[47]C. E. Osgood, Method and Theory in Experimental Psychology (New York: Oxford University Press, 1953).

significance is clear. Stimuli of the association to be learned should be made as nearly like the stimuli of the final task as possible.

It is not enough that stimuli of the association to be learned is as similar as possible to the stimuli of the final task. If learning is to effectively transfer, the stimuli and problems must be real to the learner. In short, experience must precede transfer; one cannot transfer or apply a principle to an unfamiliar situation.[48]

In a sense, identical elements and stimulus generalization both supplement each other. To whatever extent there is similarity between elements provided for the learner with those in reality, generalization to parallel situations in reality will occur.

The role of a learner's self-concept in learning is the seventh element of theory which will be applied in this study. The relationship between the development of self-concept and learning is not disputed in the literature. Writers on the development of self-concept agree that its development is inseparable from learning.[49, 50, 51]

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[48]Percival M. Symonds, What Education Has To Learn From Psychology (New York: Columbia University, Teachers College, 1964), p. 89.

[49]G. H. Mead, Mind, Self, and Society (Chicago: University of Chicago Press, 1934), p. 135.

[50]Kimbal Young, Social Psychology (Third Edition; New York: Appleton-Century Crofts, 1956), Chapter 6, p. 118.

[51]Wilbur Brookover and David Gottlieb, A Sociology of Education (Second Edition; New York: American Book Company, 1964), p. 468.

There is a definite relationship between the way an individual feels about himself and the way he feels about others. Stock finds that an individual who holds negative feelings toward himself tends to hold negative feelings toward people in general.[52] As an individual's feelings toward the self change to more positive ones, feelings about others tend to change in a similar direction. Bloom found that students with considerable hostility and negativism about themselves spend much of their time evaluating, usually negatively, the persons in the class and the ideas or contributions being considered by the group.[53] In another study involving an action-research seminar program with teachers, Moustakas cites data which demonstrates how change in teachers' behavior leads to change in students' perceptions of self resulting in a change of their behavior.[54]

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[52]D. Stock, "Investigations into Inter-Relations Between Self-Concept and Feelings Directed Toward Other Persons and Groups," Journal of Consulting Psychology, Vol. 13 (June, 1949), pp. 176-180.

[53]Benjamin S. Bloom, "The Study of the Thought-Processes of Students in Classroom Situations," University of Chicago Round Table No.766, Vol. 17 (November, 1952), p. 19.

[54]Gardner Murphy, "Affect and Perceptual Learning," Psychological Review, Vo. 63 (January, 1956, pp. 1-15.

Sommer reports that both pleasant and unpleasant results affect the development of a perception but the pleasant results have greater effect.[55]

Thus, there is research agreement that self-concept and learning are closely related. Self-concept theory proposes that feelings of inadequacy, insecurity and self-rejection will lower motivation, level of aspiration, and actual performance. But there is evidence that these feelings can be changed, causing corresponding improvement in the learner's motivation, level of aspiration, and performance.

The eighth and last element upon which this project will be based is the element which explains how learning transfers from the learning experience to practice. The ultimate purpose of education is to prepare the learner to perform and take his place in society. Efficient learning is learning that transfers to a real situation.

As previously discussed in the development of the first seven elements of theories, nearly all of these elements are conducive to transfer of learning. Insufficient evidence is available to generalize that knowledge of results causes transfer. However, evidence does allow the generalization that laboratory experiences,

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[55]Robert Sommer, "The Effects of Rewards and Punishments During Perceptual Organization," Journal of Personality, Vol. 25 (September, 1957), pp. 550-558.

learning of principles, learning through problem-solving, learning through discovery, and similarity of learning experience to the real experience are factors which help the learner to transfer knowledge into practice.

In summary, an attempt has been made to develop a theoretical framework upon which to base this study. As has already been explained, there are no inclusive, broad learning theories available upon which learning theorists and researchers are in general agreement. However, there are many elements of theories on which there is general agreement. Based upon these elements for which there is agreement, the following statements are postulated as a theoretical foundation for this study:

1. Immediate knowledge of results is important in the learning process.
2. Activity of a teacher-trainee through laboratory instruction contributes positively to learning.
3. Application of principles to problems are conducive to generalization.
4. Verbalizing principles increases generalization to similar situations.
5. Guided discovery increases retention.
6. Learning experiences must be meaningful and realistic.
7. A healthy self-concept of oneself aids learning.
8. Laboratory experiences, the learning of principles, learning through problem-solving, learning through discovery, and meaningful and realistic learning experiences are factors which contribute to transfer of training.

Definition of Terms

To assist the reader in perceiving meanings of concepts as they are used in this experiment, a definition of terms and concepts will be helpful.

Simulation

Simulation as used in this experiment is defined as a process of constructing a model, replication, or adequate reproduction of a real system. It is the process of constructing an operating model of an individual or group interaction process which allows experimentation with this model by manipulation of the variable interrelationships.

Classroom Simulator

The classroom simulator used in this study consists of a combination of physical facilities and filmed materials organized to form a model or replication of a sixth grade classroom atmosphere. Certain variables such as student attitudes, individual differences, and various discipline problems have been recreated which can be controlled and varied by the researcher.

Teacher-Trainee

Throughout this investigation, the term "teacher-trainee" shall be interpreted as a college student enrolled in a teacher education program which leads to the receipt of a college degree and state certification for teaching.

Research Assistants

Research Assistants are defined as the researchers who participated within the classroom simulator with the teacher-trainees and manipulated the classroom simulator variables.

Observers

The observers are research assistants trained to use an observational instrument and who observed the teacher-trainees in their classrooms during their student teaching assignment.

Coordinating Professors

Coordinating professors are defined in this study as university professors located at off-campus centers distributed within the state. They are responsible for scheduling student teaching assignments to teacher-trainees; for occasional visits to the student teacher's classroom; and for conducting weekly classes or seminars with the student teachers.

Supervising Teachers

In this study, supervising teachers are defined as the public school teachers throughout the entire state who receive and supervise student teachers within their classrooms.

Plan of the Study

The pertinent literature will be reviewed in Chapter II. Military and industrial uses of simulation will be described briefly but major emphasis will be placed upon a review of the literature on the research on simulation as an educational technique and its application.

The design of the study will be discussed in Chapter III. The sample will be described, followed by a description of the classroom simulator facility. Instruments developed and methods used for their validation will then be discussed. The statistical hypotheses will be given followed by a detailed description of the experimental design. Then, in the analysis of the data, the models used for the analysis and their assumptions will be discussed.

In Chapter IV the analysis of the results will be followed by a summary and discussion of the findings.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Simulation is a relatively new term in education. Few attempts have been made to use simulation techniques in the education of American youth or in teacher education.

The Armed Forces have developed and used simulation techniques widely. Simulation techniques play an important role in the training of pilots and other military personnel. Pilots receive training and then are tested in modern aircraft simulators. Air defense radar sites use simulator models for training personnel. War gaming provides valuable experience for military leaders.

Industry, too, makes use of simulation techniques in training personnel. Simulation techniques are used to test new ideas before they are put into operation in order to determine if they are more efficient than present procedures. A few examples of industrial applications of simulation are profit planning simulation, customer servicing, airline maintenance, central warehousing, and job shop scheduling.

Military and industrial applications of simulators in training personnel are reviewed in this chapter, followed by a review of the literature on simulators currently used in education. A summary and discussion of how the research findings are integrated in this study conclude this chapter.

Military Applications of Simulation

Simulation as an educational tool was introduced into the training program of the Armed Forces in 1929 when Edwin Link, a young flight instructor, saw the need for a safe and inexpensive means for teaching aircraft control. The Link Trainer went through various stages of development to the point where highly complex simulators are used in military schools.[1]

Another example of the use of a simulator for training in an operational Air Force task is the Radar Navigational Trainer developed by Searle and Murray.

> The Radar Navigational Trainer employs radar motion films as its prime component and provides a means of acquiring skill in interpreting radar scope returns, obtaining fixes, determining wind, plotting courses, and maintaining the navigational log as would be done in actual flight.[2]

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[1]Don D. Bushnell, System Simulation: A New Technology for Education (Santa Monica, California: System Development Corporation, April, 1962), p. 2.

[2]Jack A. Adams, "Some Considerations in the Design and Use of Dynamic Flight Simulators," Simulation in Social Science: Readings, Harold Guetzkow, editor (New Jersey: Englewood Cliffs, 1962), p. 36.

Experimental results measuring the differences between groups receiving training in all air missions, half air and half motion-picture training with the Radar Navigational Trainer, or all motion-picture training revealed no significant differences in the course final performance examination. The Radar Navigational Trainer greatly simplified the instruction and practice was accomplished more economically than with conventional in-flight methods of instruction and practice.

The Military employs many such trainers or simulators. A C-11C jet instrument trainer is used to simulate various instrument flying problems, radar control, and GCA (Ground Control Approaches).[3] This technique reduces the number of dual instructor-student flights and provides more effective use of actual flights. The MF-1 (T-33A) Cockpit Procedures Trainer permits training and evaluation over an extensive range of normal and emergency procedures for the T-33A jet aircraft.[4]

The Systems Research Laboratory of the Rand Corporation recreated an air defense direction center using human beings.[5] The simulator recreated the entire

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[3] Ibid.

[4] Ibid., p. 37.

[5] Kalman Cohen and Richard M. Cyert, "Simulation of Organizational Behavior," Simulation Models for Education, Nicholas Fattu and Stanley Elam, editors (Bloomington, Indiana: Phi Delta Kappa, 1965), pp. 148-152.

environment of an air defense direction center including the physical layout, the communication net, the central displays, the general atmosphere, and the cultural environment. The only manipulated variable was the task environment, i.e., the kinds and amounts of information the crews were called upon to respond to.

Chapman, in reporting the training effectiveness of this air defense laboratory experiment concluded:

> The members of each crew became an integral unit in which many interdependencies and coordinating skills developed. And each crew learned to perform more effectively. This learning showed itself in procedural shortcuts, reassignment of functions, and increased motor skill to do the job faster and more accurately.[6]

Results of the laboratory experiments prompted the Air Defense Command to contract with the System Development Corporation of RAND for training of all their air defense crews throughout the world by using simulator packages.[7]

"Monopologs" is another simulator employed by the Air Force which simulates part of the Air Force supply system. It consists of one depot and five two-wing bases.[8] The game simulates reality but compresses time and space so that players can conveniently experience essential

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[6] Ibid., p. 151.

[7] Bushnell, op. cit., p. 3.

[8] Jean Renshaw and Annette Heuston, The Game Monopologs, RM-1917-1 (Santa Monica, California: The Rand Corporation, July, 1960).

problems of management. The players practice inventory management and gain insight into inventory control problems.

> The player acts as the inventory manager for the "Widget"--a high-value, depot-reparable spare part--and makes the principal decisions of inventory control that such a manager has to make in reality. Aware of the given costs and lead times for each of his actions, he initiates procurement, plans repair schedules, and sets inventory and distribution policies.
>
> True to practical Air Force experience, the demand for the "Widget" is a random variable beyond the player's control. He is given certain limited information on the basis of which he must predict demands and establish inventory levels. He makes decisions, and in time learns their consequences. The game runs through a simulated period of 31 months, at the end of which he computes his score: the total costs his actions incurred.[9]

Monopologs is used as an educational training device. The simulator has been used effectively to train civilians who are unfamiliar with the Air Force supply system, Air Force supply managers, and aircraft contractors.

Just a few of the military applications of simulators for training personnel have been reviewed. Summarizing, simulation is used by the Armed Forces for training personnel to develop individual skills, group skills, to work together as teams, and to develop management skills.

Business and Industrial Applications of Simulation

Simulation techniques have been used for many years in business and industry for solving problems and training

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[9] *Ibid.*, p. iii.

personnel. The In-Basket Problem is one type of simulator usually employed as an individual decision-making exercise.

> Each member of the training group, working individually, is usually given from an hour to an hour and a half to study over the problem presented and to indicate in writing what action he wishes to take on each of his In-Basket items, together with his reasons for each decision. Once this decision-making period has been completed, the various courses of action taken individually are usually compared and analyzed--either by the total training class, small "buzz groups," or both.[10]

Paul S. Greenlaw emphasizes that the In-Basket technique is an excellent vehicle for stimulating discussion of management principles and concepts for a specific situation.[11]

Another simulation technique, the Incident Process, developed by Paul and Faith Pigors, centers around a labor arbitration case and calls for each student to commit himself individually in writing to a specific course of action.

> The Incident Process begins with each student being given a brief description of an incident of importance in the case under review. The group is then allotted about thirty or forty minutes to ask questions of the instructor (who has at his disposal additional information about the problem) in an effort to find out as much as they can about the situation. After

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[10] Paul S. Greenlaw, Lowell W. Herron, and Richard H. Rawdon, Business Simulation In Industry and University Education (New Jersey: Prentice-Hall, Inc., 1962), p. 12.

[11] Paul S. Greenlaw, "The In-Basket as a Training Instrument," Marketing Keys to Profits in the 1960's, Wenzil K. Dolva, editor (Chicago: American Marketing Association, 1960), pp. 452-59.

> completion of the question period, the major issues at stake are usually summarized, and each student is then asked to submit in writing an outline of the course of action he deems most appropriate to the resolution of the problem.[12]

Discussion of the positions taken by the group follows. The Incident Process places emphasis on obtaining sufficient information to make effective decisions.

Operation Suburbia, designed by Dr. Allan A. Zoll is another type of simulator.[13] In this simulator exercise each of five company groups own real estate which is mapped out in a hypothetical developmental area. Each group has a different goal and requires the acquisition of a portion of the other companies' land for its fulfillment.

The groups are given about forty or fifty minutes to negotiate with each other in any manner they see fit. To add realism to the exercise, each group is given play money, deeds, and option forms.

After negotiations, plans, and strategies have been completed the groups discuss the results. The Incident Process centers around group decision-making and provides for competitive interaction and negotiation practice.[14]

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[12]Greenlaw, Herron, and Rawdon, loc. cit.

[13]Ibid., p. 13.

[14]Ibid.

American Management Association's Top Management Decision Simulator is another popular competitive business game.[15] Each participant plays the role of a member of top management of several company teams which compete with each other involving a single product in a hypothetical market. Each company prices its products, determines its expenditures for production, marketing, research development, and plant investment. Each company receives a statement from the game administrators as to its assets and liabilities. During the simulation each company's results are plotted on charts to be discussed by all participants at the end of the simulation.

In the Top Management Decision Simulator, time is condensed representing 15 to 20 years of simulated operations which enables the fulfillment of the objective to provide as much experience in which the participants can increase their understanding of the decision-making process and sharpen their analytical skills.

Another industrial simulator, the Carnegie Tech Management Game, is a simulator for training people to become more effective business managers.[16] The packaged detergent industry is the general setting composed of three competing firms. The participants play the roles

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[15] *Ibid.*, p. 15.

[16] Kalman Cohen and Richard Cyert, *op. cit.*, pp. 144-48.

of top executives in these companies. All three firms have factories in the same area and compete against each other for the detergent market. Players in the simulator must make a host of related decisions.

> They must schedule production by product and by warehouse destination, they must purchase raw materials ahead of time, they must insure, through their employment and overtime policies, that enough workers are on hand and, through maintenance and capital investment expenditures, they must provide adequate equipment and facilities.[17]

Finished goods or excess inventory can be consigned to distinct warehouses. Firms can generate new products through research and development and must plan ahead and meet their financial commitments.

Results of training in the Carnegie Tech Management Game indicate that:

> Active participation in the Carnegie game has proved to be useful training for future businessmen. Students playing the game are challenged to deal effectively with many of the same types of problems faced by real executives. The game helps students understand that decisions made in different functional areas and on different dates are interrelated, and it helps them realize that their organization and procedures for decision making have consequences for the quality of performance which results.[18]

Another simulator is the Remington Rand Univac Sales Management Decision-Making Simulator which calls for decisions to be made in the areas of sales personnel

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[17]*Ibid.*, p. 146.

[18]*Ibid.*, p. 147.

administration, product pricing, advertising and sales promotion, and stock management.[19] It is designed for computer use.

The Dayton Tire Simulator is another simulator and is a manually scored dual-market game in which participants make decisions each quarter pertaining to prices, expenditures, advertising, and enter yearly bids for quantity tire orders.[20]

In summary, simulators serve many functions in business and industrial training programs:

1. Simulators serve as a vehicle for stimulating discussion of management principles and concepts.
2. Simulators provide practice in obtaining necessary information upon which to base decisions.
3. Simulators are used to provide experience in group decision-making and competitive interaction.
4. Simulators can provide experience in making top management decisions.
5. Simulators can suppress time to provide more experience in a shorter time interval.

Simulation in Education

A review of the literature reveals that simulation techniques have been used only to a limited extent by educators in public schools or colleges. Few attempts have been made to employ simulation techniques in education.

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[19]Greenlaw, Herron, and Rawdon, op. cit., p. 18.

[20]Ibid.

One of the first and probably the most publicized simulators in the educational field is the Whitman School Simulator experiment.[21] In this study several hundred elementary school principals from school districts all over the United States participated and played the role of the new principal of Whitman School. The "principals" were prepared for their roles by studying written materials, tape recordings, and films about Whitman School and the hypothetical community of Jefferson. The principals reacted and responded to various simulated problems presented to them by the "in-basket" technique. Examples of problems encountered are writing an article for the school paper, making a tape recorded speech to the PTA, analyzing quality of teaching of probationary teachers through viewing a film, participating in a parent-teacher conference, handling discipline problems, and answering various letters. The participants played the role of principal of Whitman School for a period of one week. At the end of each day completed work was left in an "out-basket" for scoring.

Frederiksen concluded the study by stating:

> The simulation of a standard job in educational administration through the use of in-baskets has proven to be successful as a method of collecting records of administrative performance which can be scored reliably, and yields scores which are useful

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[21]Norman Frederiksen, "In-Basket Tests and Factors in Administrative Performance," Simulation in Social Science: Readings, Harold Guetzkow, editor (New Jersey: Prentice-Hall, Inc., 1962), pp. 124-37.

in providing a better understanding of some of the dimensions of performance in such a situation.[22]

The Whitman School Simulator package was used by eight universities during the summer of 1961.[23] A survey reveals that the simulator materials were used in a variety of ways. They were used as an administrative core sequence, as an introduction to school administration, and in others as a laboratory experience. Participants in the simulator workshops included elementary principals, secondary principals, teachers, superintendents, full-time graduate students, university instructors, and counselors.

The outcomes from the standpoint of the staffs at the conclusion of the workshops were:

> The simulated situation provided high motivation and interest plus instructional opportunities not usually found in traditional courses. . . .
>
> Workshops provided an opportunity to apply theory to specific situations in working with students preparing for administrative positions. In the simulated situation the responsibility for problem solving was shifted to the group. The workshop staff was better able to appraise students' effort since each participant's approach to problem solving could be observed.[24]

Another early attempt at applying simulation techniques in teaching was developed by Harold Guetzkow at

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[22]*Ibid.*, p. 134.

[23]Glenn L. Immegart, "The Use of Simulated Materials In Eight Universities," *The Instructional Uses of Simulation in the Preparation of School Administrators* (Columbus, Ohio: University Council For Educational Administration, January, 1962), pp. 1-14.

[24]*Ibid.*, pp. 13-14.

Northwestern University in 1957-58. Five nations were simulated and operated simultaneously by two decision makers for each nation to provide experience in inter-nation relations. In each nation:

> . . . an "internal decision-maker" (IDM) made the nation's final decisions with regard to overall policies of the nation as they related to both external and internal considerations. Another participant served as "external decision-maker" (EDM), conducting the relations of his unit with other nations.[25]

The two positions, IDM and EDM, attempt to represent the nation's decision-making. The IDM's and EDM's were involved in problems of maintaining their positions in holding their office, establishing nation goals, making decisions about resources, and participating in interaction among nations.

Guetzkow concluded:

> As the war game has been judged of practical value in providing decision-maker experience to military executives, so the manning of an inter-nation simulation may be helpful in the training of foreign policy makers.[26]

At Lawrence High School, Lawrence Kansas, an International Relations Simulator was developed similar to Guetzkow's simulator.[27] The simulator was designed to

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[25]Harold Guetzkow, "A Use of Simulation in the Study of Inter-Nation Relations," Simulation in Social Science: Readings, Harold Guetzkow, editor (New Jersey: Prentice-Hall, Inc., 1962), p. 85.

[26]Ibid., p. 92.

[27]Cleo Cherryholmes, "Developments in Simulation of International Relations in High School Teaching," Phi Delta Kappan, Vol. 44 (January, 1965), p. 227.

present the basic concepts of international relations--e. g., balance-of-power, sovereignty, and international law. Three students occupy the positions of Central Decision Maker, Chief Diplomat, and Military Advisor. The Central Decision Maker had the final authority to determine the policies of his nation. Every strategy available to real nations including economic and military resources were available in the simulator.

Over a two year period, 1962 and 1963, eight simulator runs were made involving approximately 500 students. Results of an attitude scale administered during a simulator run the Spring of 1963 indicated:

1. High school students have grasped some major features of international relations.

2. Simulation in international relations at Lawrence High School tended to produce realistic attitudes toward international relations.

3. Attitudinal changes do seem to occur as a result of simulation.[28]

In the field of driver education, driver training simulators are being used successfully to teach behind-the-wheel driver training. Several series of films covering specific major areas within a total course in driving such as turning at intersections, shifting, backing, driving on hills, and driving on expressways are presented to driver education classes. Each film is divided into logical steps essential to learning.

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[28]*Ibid.*, pp. 230-231.

Each student sits behind the wheel of stationary "simulated cars." Each "car" is equiped with standard automobile equipment, including footbrake, hand brake, accelerator pedal, steering wheel, horn, directional signals, ignition switch, clutch, standard shift controls, and push button automatic shift. The students drive as they follow directions and resolve traffic problems projected before them. In the process, the reactions of each subject are recorded as a score sheet moves through a recorder.[29]

Presentation of organized driving procedures within each film and in the complete series provides for orderly effective learning of safe driving skills. By bringing street and highway conditions into the classroom, teachers are able to provide solutions for many emergency and dangerous driving situations.

Marshall Crawshaw, a California driver education consultant, has pointed out that the location and environment of a particular school may automatically limit the opportunities available to its students for driving experiences under varying topographic, weather, and traffic conditions. Through the use of driver simulators, these problems may possibly be overcome. He states:

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[29]Cecil G. Zaun and Melvin T. Schroeder, "The Driver Trainer: A Teaching Machine," Journal of Secondary Education, Vol. 37 (February, 1962), pp. 112-116.

> Not all schools have the many types of driving experiences within the distance which may be reached in dual control instruction. Steep hills, fast traffic, freeways, night driving, wet weather--these conditions involve hazards rarely possible for all students. . . . By means of simulation, however, we can provide all of these experiences to all students in all locations.[30]

Two additional simulators, The Sumerian Game and French Game, are being developed under the direction of Richard Wing by means of a Cooperative Research Grant at Yorktown Heights, New York.[31] In the Sumerian Game, a fourth grader assumes the role of a priest king in ancient Sumer and makes decisions about planting and storing grain. One-half hour of the game has been programmed for computer use.

In the French game the student observes a film sequence simulating the activities of a U. N. committee meeting. Committee members' voices are intermittedly removed from the sound track and the students attempt to fill in the parts.

Dr. Bert Y. Kersh at the Center for Teaching Research, Oregon State System of Higher Learning, Monmouth, Oregon, has experimented with a classroom simulator for training

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[30]John W. Gibbons, "Simulators: Research Tools," Safety Education, Vol. 41 (November, 1961), p. 15.

[31]"Status Report on Research Project," mimeographed sheet received through personal correspondence with Richard Wing, Chief Investigator, Project 2841, Northern Westchester Board of Cooperative Educational Services, 845 Fox Meadow Road, Yorktown Heights, New York.

teacher-trainees.[32] The first part of this study relates directly to the Kersh study.

Kersh developed a set of 60 filmed problems and student responses based upon the work of Marie Hughes. Hughes identified in a study of the public schools in Utah the most common types of problems encountered by student teachers during their student teaching experience.[33] Dr. Kersh developed his filmed materials based upon the problems encountered most frequently in the Hughes study. Kersh selected 40 Junior and Senior teacher education students screened on the basis of scholastic aptitude, sex, age, and experience with children and assigned the students to four matched experimental groups. The groups were:

Group 1 Large-Motion (most realistic)

Group 2 Small-Motion (intermediate)

Group 3 Large-Still (intermediate)

Group 4 Small-Still (least realistic)[34]

A pre-test given in the simulator to each group indicated no significant differences between the groups.

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[32]Bert Y. Kersh, Classroom Simulation: A New Dimension in Teacher Education, Final Report, Title VII, Project Number 886, National Defense Education Act of 1958 (Monmouth, Oregon: Teaching Research, Oregon State System of Higher Education, June 30, 1963).

[33]Marie Hughes, et al., A Research Report: Assessment of the Quality of Teaching in Elementary Schools (Salt Lake City: University of Utah Press, 1959).

[34]Kersh, op. cit., p. 7.

During instruction students were presented with filmed problems to which they responded verbally and physically. Based upon the student's response to the problem, filmed feedback sequences were then presented to enable the student to see class behavior elicited by his response. The effect of this experience was measured by a post-test with another set of filmed problems.

Kersh hypothesized that a realistic display (life-size picture and motion) would enhance learning. He found that the simulator experience did enhance learning but a less realistic (small picture and motion) mode of presenting the filmed problems and sequences was more effective than a realistic mode of presentation. Kersh concluded that with a less realistic mode of presentation the learner did not feel involved as was the case with the realistic mode. He further concluded that the experimental design failed to control the learning which must have resulted during the pre-test experience which was shared by all subjects.

A review of the literature on simulation techniques in education reveals that very few attempts are being made to use simulation techniques in education. The attempts that have been made pertain to the following areas:

1. Simulation techniques have been devised and are being used in the training of elementary school principals.

2. An Inter-Nation Relations Simulator has been developed and has been used with apparent success

in teaching international relations at the college and high school levels.

3. The use of driver training simulators is increasing in the field of driver education.

4. Simulators are being developed for use at the elementary school level for teaching Government and French.

5. A Classroom Simulator has been built and used to provide pre-student teaching experience for teacher-trainees.

Insufficient research evidence is available to generalize on the success of these attempts.

Discussion of Previous Research

The review of the literature reveals that the Armed Forces have used simulators effectively in their training programs for many years. Simulators have been used effectively in developing individual skills, group skills, teamwork, and management skills.

Simulators serve many functions in business and industrial training. Simulators:

1. stimulate discussion of management principles and concepts;

2. provide practice in obtaining information necessary for making decisions;

3. provide group decision making and competitive interaction experiences;

4. provide experience in making top management decisions;

5. can suppress time to provide for more experience in a short time interval.

The review reveals that very little experimentation with simulation exists in the educational field. Simulators have been developed for training elementary school principals and teachers; for teaching international relations at the high school and college levels; and are being developed to teach Government and French at the elementary school level. There is not enough research evidence available as yet to fully evaluate their effectiveness.

The first part of this study relates directly to the realistic (life-size projection and motion) mode of the Kersh study. The classroom simulator materials (Mr. Lands' simulated sixth grade class) as developed, tested, and revised by Kersh and based upon the work of Hughes (1959) are used.

Kersh's results exposed a few problems which his experimental design failed to control. First, the design did not control the amount of learning which may have occurred during the pre-test. The second problem was that of a small N size (10 subjects per cell as dictated by the nature of the classroom simulator which was designed for individual instruction). As a result of using fewer cells in this study, an N size of 30 subjects in the experimental and control groups was used which should increase the strength of the findings. The pre-test error was eliminated in this study by eliminating the pre-test experience.

In addition to the simulator post-test, a follow-up study of the transfer effect of simulator experience to the classroom behavior of the subjects was also conducted.

After reviewing the literature and discussing its implications for this study in this chapter, the experimental design is described in Chapter III.

CHAPTER III

DESIGN OF THE STUDY

The Classroom Simulator Facility

The classroom simulator facility used in this study was a replica of the simulator developed by Dr. Bert Kersh.[1] Because the first part of the experiment related directly to the realistic (life-size projection and motion) mode of the Kersh study, the classroom simulator materials developed, tested, and revised by Kersh were used.

The classroom simulator consisted of three units: a simulated classroom, an equipment area, and the simulator materials.

The simulated classroom was a room approximately 9 x 11 feet, which included a chalkboard and a bulletin board to recreate as nearly as possible the front area of a classroom. Art work and student work was exhibited on the bulletin board. A third wall was composed of a large 6 x 9 foot rear projection (RP) screen which represented the remainder of the classroom during operation. A

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[1] Bert Y. Kersh, Classroom Simulation: A New Dimension in Teacher Education, Final Report, Title VII, Project Number 886, National Defense Education Act of 1958 (Monmouth, Oregon: Teaching Research, Oregon State System of Higher Education, June 30, 1963).

teacher's desk added to the realism. A control panel was placed in one corner of the room near the RP screen which enabled a research assistant to control the projection equipment. (See Appendix A.)

The equipment area consisted of four Bell and Howell Film Sound Specialist Projectors, Models 285, 385, and 399, with common rear-surfaced mirrors placed in front of the lenses. The mirrors were necessary to reverse the image for RP operation. The projectors were mounted centrally behind the screen. Photoelectric cells were placed behind each projector film gate to stop the projectors after each sequence. Another control panel was located adjacent to the projectors for use by an operator who was responsible for rewinding, focusing and other emergencies.

The simulator materials were identified as "Mr. Land's Sixth Grade." A single sixth grade classroom was simulated through the use of motion picture films and printed materials. The materials were developed initially as part of a research project supported by the U. S. Office of Education under Title VII, National Defense Education Act of 1958 (Kersh, 1963). Mr. Land is the fictitious name of the regular supervising teacher for the class of 22 youngsters. The simulation materials include a complete set of cumulative records for each of the youngsters, a short description of the hypothetical school and community plus orientation films showing Mr. Land working with his class in a typical fashion. The main body of the materials used in the instructional phase include a total of 60 problem sequences on film. Each contains alternative feedback sequences designed to show the student teacher the possible consequences of his handling of the problem. The 60 problem sequences were divided into three sets of 20 sequences each (Programs I, II, III). Each of the three programs corresponded to one school day and were roughly parallel in terms of the types of problems included.[2]

The printed materials consisted of an instructional procedure sheet for each of the 60 problems. Included in each instructional procedural sheet was a description of the situation to be read to the teacher-trainee, a brief description of the problem, and "hold" cues telling when the projector should be stopped leaving a still picture on the screen. Also included on the instructional procedural sheets were the standards (principles) which should be applied in solving the problem including examples of such use, feedback descriptions explaining what is on each filmed feedback sequence, the stimulus situation or

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[2]Bert Y. Kersh, "Instructions for Using Classroom Simulation Materials," Mimeographed materials received through correspondence (Monmouth, Oregon: Teaching Research Division, January, 1965).

specification of the problem, and supplementary information.[3] (See Appendix B for samples.)

The simulator filmed materials were divided into three reels; a problem reel and two response reels. Each of these were placed on one of three projectors for projection. The fourth projector was used with a continuous loop of a slow pan around the classroom to aid the subject in associating names from a seating chart to the faces of class members.

The control panel in the classroom simulator enabled the research assistant in the simulator to start, stop, or hold a frame as a still picture, adjust volume, cue the operator to focus, advance, or rewind any one or all of the filmed problems or responses. (See Appendix C.)

The operator's control panel in the equipment room was necessary as a cueing board and held the electronic components of the system. The operator could cue the research assistant when any one or all the projectors were ready for operation. This panel would not allow the operator to turn on a projector lamp or sound. (See Appendix D.)

Description of the Sample

The subjects selected to participate in this experiment were randomly selected during the Winter quarter from the Junior level educational methods classes which formed an "Elementary Bloc Sequence" at Michigan State University.

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[3] Ibid.

The courses which composed the "bloc" wer Education 321A, 321B, and 321C. This sequence of classes immediately preceded the subject's student teaching assignment. There were 156 students enrolled in this sequence during the Winter quarter of 1965.

Not all of the 156 students enrolled in the "Elementary Bloc Sequence" were eligible for selection in the simulator experiment. Certain restrictions were dictated by the nature of the experimental design. Since a transfer test was to be administered during the student teaching assignment the following quarter these dictated restrictions were:

1. To be eligible for student teaching at Michigan State University, students must have a 2.0 or "C" average. This eliminated some subjects from the experiment.

2. Students not registered for student teaching during the quarter following their "bloc" experience were also dropped from the population.

3. To assure equal treatment to all subjects involved in the experiment, subjects not enrolled for all three sections within the Elementary Bloc Sequence, 321A, 321B, and 321C, were dropped from the population.

Sixty subjects were randomly selected from the "adjusted" population of 107 students. The all-university grade point average (GPA) for the "adjusted" population ranged from a low of 2.15 to a high of 3.91. The mean GPA was 2.62 with a standard deviation of .39.

The subjects' ages in the sample ranged from 20 to 23 with one subject at age 31. The mean age was 21.22 and standard deviation 1.51.

Only nine boys were enrolled in the elementary bloc. By chance, eight were included in the sample.

All but seven subjects were from Michigan. Three subjects were from the state of New York and one subject from each of the following states: Connecticut, Massachusetts, Pennsylvania, and Washington, D. C.

Instrumentation

Two instruments were designed and tested for use in this experiment. A post-test instrument was designed to measure the effectiveness of the treatment (the simulator experience). To determine if the concepts formed and the skills developed during the simulator experience transferred into use during each teacher-trainee's student teaching experience, an Observational Record Form was developed and tested. Confidence and attitude scales were also constructed.

Post-Test Instrument

The post-test was divided into three sections: (1) Assessment, (2) Principles, and (3) Response. (See Appendix E.) These three sections corresponded with the processes that the teacher-trainee was expected to follow in solving each problem, namely: (1) assessment of the problem to determine specifically what was the problem; (2) formulation of the most effective method to cope with the problem, i. e., awareness of principles to apply; and (3) application of the principle or principles in physically and verbally solving the problem.

The principles used in solving the problems in this study were the standards developed initially by a jury of master teachers in the Kersh study previously discussed.[4] The standards were later revised and again tested by Kersh's project staff and are as follows:

1. In problems involving rules of procedure, defer to authority vs. establish own rules.
2. Show supporting manner vs. show non-supporting manner.
3. When learners appear disinterested or confused, it is T's responsibility to stimulate a more active interested response vs. to make no effort to change the learner's response.
4. Be attentive to entire class as well as the individual vs. be attentive either to the individual or to the class only.
5. Discourage undesirable behavior vs. encourage undesirable behavior.
6. When direct action is required to control a disruptive group (individual), act quickly vs. delay.
7. To control a disruptive group (individual), communicate at close range vs. communicate from a distance.
8. Encourage student initiative to learn vs. discourage student initiative to learn.

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[4]*Ibid.*

9. When learners exhibit deviant behavior, deal with the individual (s) directly with minimal disruption of instructional continuity vs. disrupt instruction.

10. When learners appear to make an inappropriate response, T should encourage learners to replace it immediately with an appropriate response vs. does not encourage change.

11. When confronted with conflicting parent-school interests, the student teacher maintains a neutral behavior.[5]

Standard 11 was deleted by the Kersh staff in the revised materials. Because several problems dealt with this particular problem this standard was included in this study.

After operationalizing the standards, they were reworded into "if-then" statements and are referred to as the principles in this experiment.

Each of the major divisions of the post-test instrument--assessment, principles, and response--were scored during the post-test, based upon the pre-established criteria developed and tested by Kersh.[6] The scoring criteria and procedures are as follows.[7]

Assessment.--After the teacher-trainee reacted to a problem, he was asked to assess the problem verbally. The

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[5]Kersh, January, 1965, op. cit.

[6]Ibid.

[7]Classroom Simulator Post-Test Procedure sheet used by the research assistants are located in Appendix F.

assessment of the problem was scored by awarding one point to the subject for each of the stimuli listed under "Stimulus Situation" on the problem instructional procedure sheet which the subject identified verbally for the researcher.

Principles.--After assessing the problem, the teacher-trainees were asked to state the principles they were aware of and those which they applied in solving the problem. The number of principles required to solve each problem varied from one to three as specified by the panel of judges and listed under "Standards" on the problem instructional procedural sheet. One point was given for each correct principle or principles the subject was aware of when solving the problem and could verbalize to the researcher.

Response.--The teacher-trainees' physical and verbal response to each problem was scored by comparing his overt response to the principles required for the solution of the problem.

If three principles were required, one point was awarded to the subject for each principle correctly applied establishing a range from zero to three points.

If two principles were required three points were awarded if two principles were correctly applied; two points if one principle correctly applied; one point if no correct principles were applied but the subject did respond; and zero points if the subject did not respond.

If only one principle was required, according to the criteria as stated on the problem instructional procedure sheet, two points were awarded if the one principle was applied correctly; one point given if no principles were applied but the subject responded; and zero points given if the subject did not respond. The scoring of the responses is summarized in Table 1.

These scores were added for a total individual problem score and all individual total problem scores were again totaled for the subject's total post-test score.

The inter-observer reliability test of the Post-Test Instrument was scheduled during the last two weeks of the instructional phase of the project. Two research assistants made independent observations of the same teacher-trainee during random hours of instruction. One research assistant was located within the simulator, working with the subject on instructional problems. The other research assistant was located outside the door of the simulator and observed through the door to record the teacher-trainee's behavior. During the first attempt by each teacher-trainee to cope with a problem, each of the research assistants independently rated the subject on the Post-Test Scoring Sheet according to how the subject responded to the problem, his verbal assessment of the problem, and the principles which the subject stated he applied to solve the problem.

TABLE 1.--Procedure for scoring problem responses during classroom simulator post test.

Standards (As specified by the problem Instructional Procedural Sheet)	Score for Response	
3 Principles Required	3 points	3 principles applied
	2 points	2 principles applied
	1 point	1 principle applied
	0 points	0 principles applied
2 Principles Required	3 points	2 principles applied
	2 points	1 principle applied
	1 point	0 principles applied but subject did re-spond
	0 points	subject did not respond
1 Principle Required	2 points	1 principle applied
	1 point	0 principle applied but did respond
	0 points	subject did not respond

At the completion of each hour, the two research assistants had completed three or four independent observations of problem solutions. Discrepancies between their independent observations were noted and discussed in an attempt to determine the cause of the discrepancies. The differences were then corrected. At the completion of one week using these procedures, the research assistants had very few discrepancies.

During the second week of such training, the research assistants were not allowed to change their ratings, but were asked to discuss discrepancies only. After 12 independent observations with approximately four subjects, a Pearson-Product-Moment Correlation Coefficient was calculated and the coefficient of observer agreement correlation was .91. Later during the same week, another correlation was calculated using an N of 18. This correlation equalled .87.

During the first week of the Post-Test the research assistants again made independent observations, following the same procedures but deleting the discussion after each observation of 10 subjects. Ten subjects, each solving 20 problems, produced an N of 200 problems. However, five observations were missed by one observer during this period of time due to interruptions. A Pearson-Product-Moment Correlation Coefficient based upon an N of 195 produced a coefficient of observer agreement of .63.

This index would have probably remained higher if discussion and review of the criteria had been employed periodically during the post-test.

Observational Record Form

After surveying existing observation forms, it became apparent that an observational form would need to be designed to meet the needs of this experiment. A greatly modified Flanders observational form was the result.[8]

Specific student behaviors and the required principles applied in solving problems pertaining to these behaviors were operationalized. The observational form was designed to identify the frequency of occurrence of these student behaviors and to record the teacher-trainee's behavior in handling each problem, i. e., which principles were applied.

The Classroom Simulator provided experience for the student in identifying and solving problems with five types of student behaviors. The student behaviors were (1) inattention, (2) baiting and testing, (3) disorderly conduct, (4) distracting behavior, and (5) fatigue. In the process of solving problems based upon these five behaviors, the teacher-trainees discovered and developed the 11 principles developed by Kersh which were discussed earlier in this report.

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[8]Donald M. Medley and Harold E. Mitzel, "Measuring Classroom Behavior by Systematic Observation," Handbook of Research on Teaching, N. L. Gage, editor (Chicago: Rand McNally and Company, 1963), pp. 271-74.

The purpose of observing the teacher-trainees during their student teaching assignment was to determine if the skills developed in the classroom simulator of identifying the five behaviors and discovering and applying the 11 principles in solving problems dealing with the five behaviors would transfer and be employed during the teacher-trainee's student teaching assignment. The Classroom Observational Record Form was designed to collect data to answer the following questions:

1. Does the student teacher identify the following student behaviors: (1) inattention, (2) baiting and testing, (3) distracting behavior, (4) disorderly conduct, and (5) fatigue?

2. Is the student teacher able to solve problems pertaining to the five behaviors?

3. Does the student teacher apply the 11 principles correctly and appropriately in solving the problems?

The first step in developing the Classroom Observational Record Form was to operationalize the five classifications of student behaviors and the 11 principles upon which the simulator materials were based. The next step was to decide how the instrument could be constructed so as to require the least number of subjective judgments by the observer but still remain as simple as possible and provide for the recording of the desired data.

The result was a one page recording form which required the observer to place a tally (1) on the sheet adjacent to the listed behavior each time the behavior occurred, tally how the teacher trainee handles the problems, and list the principles applied. (Appendix G.) Directions for using the Classroom Observational Record Form were then constructed. (Appendix H.)

Arrangements were made to visit 10 elementary classrooms for training the observers to use the instrument. During the observations, the observers were seated toward the front of the room so the class members and the teacher could be observed. After each observation, differences in ratings on the observational form were discussed and resolved. As training progressed it became more effective to sit as a group to enable the observers to communicate together.

Several changes were made in the Classroom Observational Record Form during the observer training sessions. It became apparent that the observations would need to be broken into smaller time intervals instead of the full one-hour interval in order to eliminate constant checking of individual continuous behavior. Five minutes was decided upon as the time interval to be used. Each observer would observe and tally in five-minute intervals and then begin over again using the same observation form. If a particular student exhibited a specific behavior intermittently during this five minute period, the student behavior would be tallied only once during that time interval. If the behavior was exhibited by the same student during the next time interval, it would again be tallied.

Several problems were encountered in the operational definitions of the behaviors and principles. These were corrected and rephrased.

Coefficient correlations of observer agreement were calculated using a Coefficient of Intraclass Correlation technique before and after the observers received training for using the instrument.[9] The purpose of the correlations before training was to obtain an indication of observer agreement between untrained observers--namely, the supervising professors and classroom supervisors. Table 2 summarizes the calculated coefficient correlations. The "before" correlations were computed from data collected after the three observers had studied the directions which accompanied the instrument for thirty minutes and then made independent observations within the same classroom during a one hour observation. The "after" correlations were computed after receiving eight hours of training in various classrooms using the instrument.

The correlations obtained before training for "Behaviors Occurred in Class," "Student Teacher Aware," and "How Did Student Teacher Handle Situation--Adequate" gave some

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[9]Ernest A. Haggard, Intraclass Correlation and the Analysis of Variance (New York: The Dryden Press, Inc., 1958), p. 39.

TABLE 2.--Coefficient correlations of observer agreement before and after receiving training on using the observational record form.[a]

Reliability Coefficient	Behavior Occurred in Class	Student Teacher Aware	How Did Student Teacher Handle Situation?			Principles Applied Correctly	Principles Applied Incorrectly	Principles Applied to No Specific Behavior
			Adeq.	Accept.	Inad.			
Before Training	.61*	.83*	.60	.06	-.11	.26	Insufficient Occurrence	Feature Added Later
After Training	.96*	.92*	.74*	.85*	.80*	.86*	.36**	.67*

Note: Adeq. = Adequately; Accept. = Acceptable; Inad. = Inadequately.
* Significant, $p<.01$
** Significant, $p<.05$

[a]Ernest A. Haggard, Intraclass Correlation and the Analysis of Variance (New York: The Dryden Press, Inc., 1958), p. 39.

support for using the observations completed by the co-ordinating and supervising teachers. However, the correlations found between observers in the remaining categories of the instrument before training are extremely poor. The "after training" coefficient correlations of observer agreements indicated that the observers did learn to use the instrument accurately.

Confidence Scale

A confidence scale was designed to determine if a teacher-trainee's level of confidence in his ability to teach could be increased through classroom simulator experience. The confidence scale was limited to the measurement of the teacher-trainee's confidence only in skills which were experienced within the simulator. A nine-question, four-point scale, similar to a Likert Scale was devised. The midpoint on the scale was eliminated to force the teacher-trainees to take a position above or below a center position. This instrument was administered to both groups before simulator experience and after the post-test. No attempt was made to validate this instrument. (Appendix I.)

Student Reactions to Simulator Training

To determine the attitude the teacher-trainees had toward their classroom simulator experience a Student Reaction to Simulator Training instrument was constructed. This instrument asked 12 objective questions directed at discovering the feelings the teacher-trainees had toward the simulator experience. An open-ended question was also included. This instrument was administered to the experimental group after their simulator experience and again during their student teaching assignment. No attempt was made to validate this instrument. (Appendix J.)

The Statistical Hypothesis

To determine the effectiveness of providing simulated classroom experiences in the Classroom Simulator to teacher-trainees three statistical hypotheses were tested.

Null hypothesis$_1$:

> No differences will be found between groups provided with and without classroom simulator experience in the ability to correctly identify and react to representative classroom problems as measured by a simulator post-test.
>
> Symbolically: H_{o_1}: $M_1 = M_2$
>
> Legend: M_1 = experimental group mean
> M_2 = control group mean

Alternate hypothesis$_1$:

> Subjects receiving classroom simulator experience will be more able to correctly identify and react to representative simulated classroom problems as measured by the post-test than will the subjects who have received no classroom simulator experience.
>
> Symbolically: H_1: $M_1 > M_2$
>
> Legend: M_1 = experimental group mean
> M_2 = control group mean

Null hypothesis$_2$:

> No differences will be found between groups provided with and without classroom simulator

experience in their ability to correctly identify, respond, and correctly apply principles to solve representative classroom problems as measured by an observational criterion instrument during the teacher trainee's student teaching assignment.

Symbolically: H_{o_2}: $P_1 = P_2$

Legend: P_1 = proportion of subjects identifying and responding correctly in experimental group.
P_2 = proportion of subjects identifying and responding correctly in control group.

Alternate hypothesis$_2$:

Subjects receiving classroom simulator experience in identifying, responding, and applying principles to solve representative classroom problems in the classroom simulator will be more able to identify and react effectively to actual classroom problems as measured by the observation criterion instrument during their student teaching assignment than will the subjects receiving no simulator experience.

Symbolically: H_2: $P_1 > P_2$

Legend: P_1 = proportion of subjects identifying and responding correctly in experimental group.
P_2 = proportion of subjects identifying and responding correctly in control group.

Null hypothesis$_3$:

No difference will be found in confidence levels of subjects toward their ability to teach as measured by a confidence scale between groups provided with and without classroom simulator experience.

Symbolically: H_{o_3}: $M_1 = M_2$

Legend: M_1 = experimental group mean
M_2 = control group mean

Alternate hypothesis$_3$:

> Subjects receiving classroom simulator experience will exhibit a higher level of confidence in their ability to teach as measured by a confidence scale than a group not receiving simulator experience.
>
> Symbolically: H_3: $M_1 > M_2$
>
> Legend: M_1 = experimental group mean
> M_2 = control group mean

The Experimental Design

A two factorial design was employed as diagrammed in Figure 1. As previously described, the sample consisted of 60 subjects. The sample was divided into two groups, 30 subjects in an experimental group and 30 subjects in a control group, each group consisting of 15 subjects with high all-university grade point averages (GPA) and 15 subjects with low GPA's.

	Experimental Group	Control Group
High GPA	15 subjects	15 subjects
Low GPA	15 subjects	15 subjects

Figure 1.--The Experimental Design.

Assignment of Experimental and Control Groups

The subjects were selected and assigned to experimental and control groups by the following procedures. The

107 subjects within the "adjusted" population were arranged in rank order according to their GPA from high to low. The median was located which divided the subjects into two groups, a high GPA group and a low GPA group. These groups formed basically a "B" (high group) with GPA's from 2.5 to 3.91 and a "C" (low group) with GPA's from 2.15 to 2.48. Both groups were then numbered from 1 to 53. To determine where the remaining student should be placed, a coin was flipped.

A table of random numbers was used for assigning students to the experimental or control groups. To determine if the first student selected through the table of random numbers should be assigned to the experimental or control group, a coin was flipped. The first 30 students selected by the table of random numbers from the high GPA group were alternately assigned to the control and experimental groups. The next ten students were assigned to the two groups as alternates to be used if needed. The same procedure was used in selecting and assigning the members of the low GPA group to the experimental or control groups. A t-test revealed no significant differences between the GPA's of the experimental and control groups. The experimental group had a mean of 2.62 and standard deviation of .40; the control group had a mean of 2.64 and standard deviation of .38. (Table 3.)

TABLE 3.--Comparison of all-university grade point average means and standard deviations of experimental and control groups.

	Experimental Group	Control Group	t*
Mean	2.62	2.64	.404**
Standard Deviation	.40	.38	

t* is significant if $\geq$ 2.008 @ alpha .05 level of confidence.

**Not significant.

As was previously discussed, few boys were enrolled in the Elementary Bloc. Accordingly there were only 2 boys and 27 girls in the experimental group; and 6 boys and 24 girls in the control group.

Ages of the experimental group ranged from 20 to 22 with one subject at age 31. The mean age was 21.41 with a standard deviation of 1.95. The control group ages ranged from 20 to 23 with a mean age of 21.03 and standard deviation of .78. (Table 4.) Examination of the ages of the subjects within the two groups revealed no significant differences between the two groups. (Table 5.)

TABLE 4.--Comparison of age means and standard deviations of experimental and control groups.

	Experimental Group*	Control Group
Mean	21.41	21.03
Standard Deviation	1.95	.786

*One age 8 years deviant from others.

TABLE 5.--Distribution of ages within the experimental and control groups.

	Frequency	
Age	Experimental Group	Control Group
20	6	8
21	14	14
22	8	7
23	0	1
31	1	0
	N = 29*	N = 30

*One age not available.

No attempt was made to control the variable of experience with children. This variable was assumed to be distributed equally in both groups through randomization.

Treatment

The first phase of the study measured the effectiveness of the classroom simulator in providing experiences for which teacher-trainees practiced identifying and reacting to representative classroom problems within the Classroom Simulator. Subjects in the experimental group were trained in the simulator individually in hourly sessions lasting over a period of nine weeks, completing seven hours of training. The remaining two hours were used in orientation and testing.

Each teacher-trainee in the experimental group was orientated to the simulator and apparatus. During the orientation the teacher-trainee studied the cumulative records, printed descriptions of the school and community, and "observed" the simulated class for approximately one half hour while studying the seating chart. The teacher-trainee also introduced himself to the class.

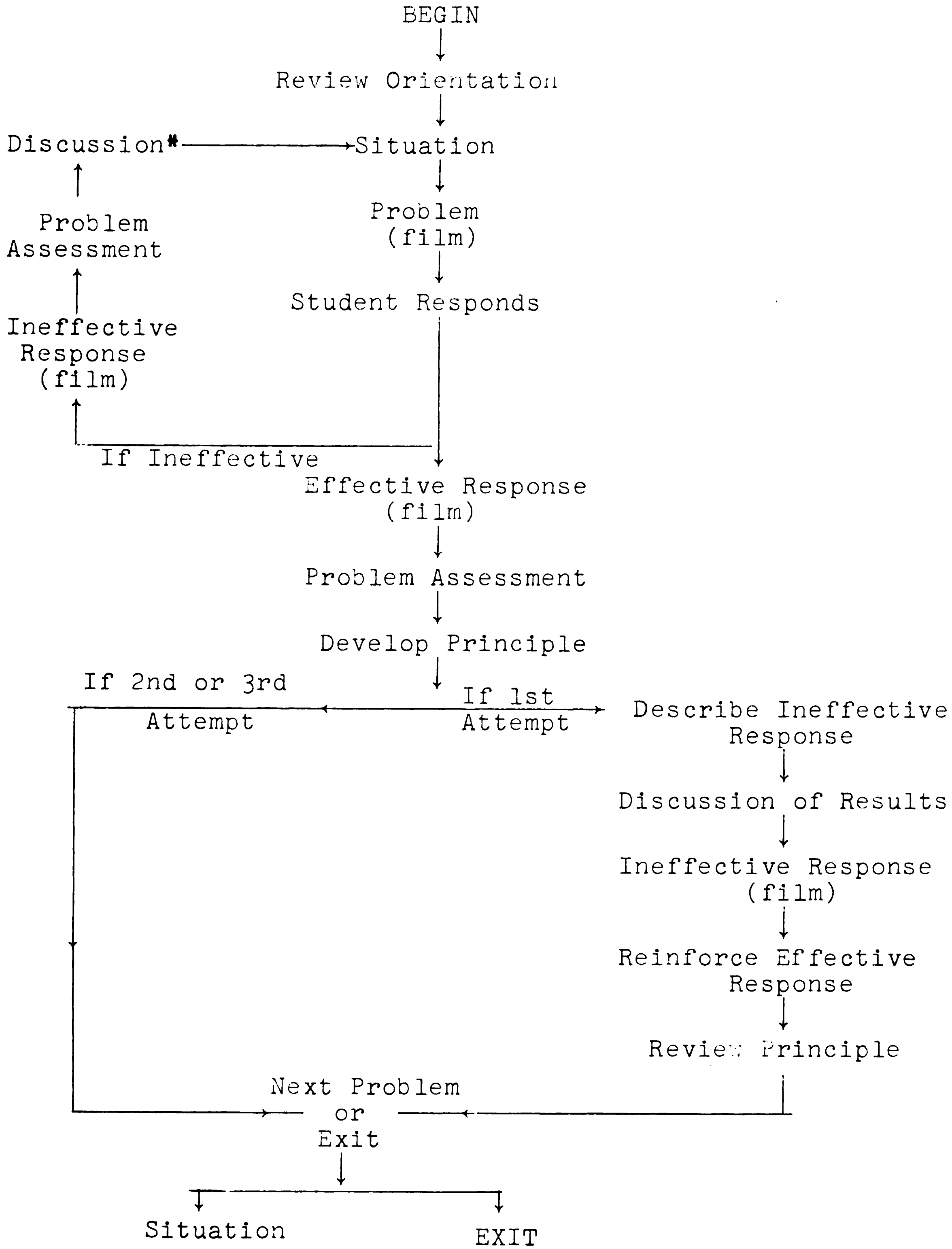
Instruction began with a set of 20 problem sequences which provided teacher-trainees experience in coping with five types of classroom behaviors. The five classroom behaviors and simulator problems dealing with them are summarized in Table 6.

TABLE 6.--Simulator classroom behaviors and related problem sequences.

Behaviors	Problem Sequences		Total
	Program	Problem	Problems
Inattention	I II	4, 14, 16, 17 6, 16	6
Baiting and Testing	I	5, 6	2
Disorderly Conduct	I	7, 10, 11	3
Distracting Behavior	I	12, 13, 15	3
Fatigue	I	9, 18	2
Miscellaneous*	I	1, 2, 3, 8	4
TOTAL			20

*Individual Student and Content Problems.

An instructional model was developed and followed during each simulator training session. To assist the teacher-trainee in building an association between faces and names, the teacher-trainee was given an opportunity at the beginning of each instructional period to view the class while studying a seating chart. The situation from the instructional procedural sheet was read by the research assistant to the teacher-trainee before each filmed problem was presented. Figure 2 represents the instructional model used during the instructional phase.



*Guided discovery technique.

Figure 2.--Classroom Simulator Instructional Model

The problems were presented individually. The teacher-trainee identified them and reacted physically and verbally as he or she would need to do in the real classroom. Vased upon his or her response to the problem, the teacher-trainee was immediately shown a feedback sequence of how the class might react. The problem and sequences were presented repeatedly until the student elicited a desirable response based upon pre-established standards. Interaction between the teacher-trainee and the research assistant occurred after the teacher-trainee responded and was shown the feedback filmed response. However, non-directive techniques were used in an attempt to force the teacher-trainee to rely heavily on the feedback sequences and supporting records in his self-evaluation.

A guided discovery technique was employed. It became apparent during the first instructional period that a pure discovery technique would require additional time. In addition, the anxiety level of subjects who made consecutive errors increased until the subjects could no longer respond effectively.

After the teacher-trainee "discovered" the correct response, the appropriate filmed response was presented so the teacher-trainee could see the slicited class behavior. The teacher-trainee then developed a principle which might be applied in solving similar problems.

If the teacher-trainee responded correctly to the problem on the first attempt, he was asked how an ineffective teacher might react to the problem and what type of class behavior this might elicit. The ineffective filmed response was then presented. The purpose of this sequence was to impress upon the teacher-trainee the importance of making the correct response. The correct response was then verbally reinforced by eliciting from the teacher-trainee the correct response. The teacher-trainee then reviewed the principle or principles which he developed before progressing to the next problem.

The control group received no instructional training in the classroom simulator. Teacher-trainees in the control group experienced the orientation sequence only before participating in the post-test.

Controls

The sixty subjects were randomly selected from the population and randomly assigned to one experimental group and one control group by using a table of random numbers. Therefore, it was assumed that variables were distributed randomly between the two groups.

The subjects were told that the scores received in the simulator post-test would not be used by their class professor, but reminded that the simulator experience was an expected part of their class work. The research assistants were rotated during the instructional phase so each teacher-trainee received fifty per cent of his training from each research assistant. The control of variables are summarized in Table 7.

TABLE 7. --Summary of varible controls.

Variables	Method of Control
1. Experience with children	Distributed randomly through random assignment to groups.
2. Motivation	Same directions given both groups when administrating tests. Differences assumed distributed randomly.
3. Researcher's Bias	Removed from instructional phase.
4. Research Assistants' Biases	Counter-balanced through rotation.

Analysis of the Data

The effect of the classroom simulator treatment as measured by the post-test was analyzed by a Fixed Effect Two-Way Analysis of Variance Model.[10] This model has several basic assumptions which should be met before the model is appropriate. The first assumption that the measurement met the requirements of interval measurement was assumed.

[10]William L. Hays, *Statistics for Psychologists* (New York: Holt, Rinehart, and Winston, 1963), pp. 385-412.

Because the sample was randomly drawn from an assumed normal population of teacher education students the assumption that the errors are normally distributed within each treatment-combination population was also assumed to be true. Examination of the data revealed approximately normal distribution of scores within each group. There were relatively large numbers of observations per cell which made the requirement of a normal distribution of errors rather unimportant.[11] An F-test of the variance of each group revealed no significant differences between variances of the control and experimental groups within the assessment and principle protions of thepost-test data. Significant differences did exist between the two groups on the response section of the test. (Table 8.) However, with an equal number of observations in each cell, the requirement of equal error variance may also be violated without serious risk.[12]

To satisfy the last assumption of independence of errors within and across each treatment combination, it was assumed that the error portions entering into the respective observations were independent. This was assumed through assignment of different subjects in the control and experimental groups and through independent analysis treatments of the measured variables.

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[11] Ibid., p. 408

[12] Ibid.

TABLE 8.--Comparison of experimental and control group Post-Test variances.

	Variance		F
	Experimental Group	Control Group	
Response	36.30	89.62	2.47*
Assessment	17.06	17.16	1.01
Principles	23.89	39.59	1.66

F is significant if $\geq$ 1.85 @ .05 level of confidence.
F is significant if $\geq$ 2.41 @ .01 level of confidence.

*Significant, $p < .01$.

Since the data collected with the Observational Record form for the purpose of determining the transfer effects of the treatment did not meet the assumption of the Analysis of Variance Model, other tests were used. To analyze the data collected in the "Behavior Occurred in Class" and "Student Teacher Aware" columns of the Observational Record form for the purpose of determining the awareness of the experimental and control groups to the behaviors, a z-test was used to test the differences between the two proportions by normal approximation. The z-test was chosen because the sample size was large in which case the binomial can be approximated by normal distribution.

To analyze the data in the three columns under "How Did the Student Teacher Handle the Situation?" the Chi-square was chosen because the two groups (experimental and control) were independent and because the scores under study were frequencies in discrete categories (adequate, acceptable, and inadequate).

The Chi-square test was again employed to analyze data in the "Principles Applied to Correct the Behavior" column. The same assumptions were satisfied.

The "Principles Applied But Not to Any Specific Behavior" column were recorded descriptively.

The Confidence Scale was analyzed by the Two-Way Fixed Effects Model Analysis of Variance. Values were assigned to the classifications on the scale to meet the assumption of interval scale. The values assigned were: very confident 4; confident 3; uncertain 2; and very uncertain 1. Examination of the Confidence Scale scores revealed a normal distribution. An F-test revealed no significant differences between the variances of the experimental and control groups. (Table 9.)

TABLE 9.--Comparison of experimental and control group confidence scale variances.

	Variance		F
	Experimental Group	Control Group	
Confidence Scale	12.88	9.92	1.30

F is significant if $\geq$ 1.85 @ .05 level of confidence.
F is significant if $\geq$ 2.41 @ .01 level of confidence.

Because different subjects were assigned to experimental and control groups and each question on the instrument was independent of others, the assumption of independence was assummed.

Since the "Student Reactions to Simulator Training" questionnaire was administered only to the experimental group, the responses on the instrument were recorded as percentages.

Summary

A replica of a front section of an elementary sixth grade classroom was constructed. The remaining portion of the classroom was simulated through the use of a large rear-projection screen where classroom problems and class feedback sequences were projected in the form of 16mm. sound and color motion pictures in large "life-like" size. Subjects in an experimental group received nine hours instruction individually in the simulator. Problems were presented, the teacher-trainee physically and verbally responded, and feedback of possible class reactions were presented to the subject. The problem and feedback sequences were presented repeatedly until the teacher-trainee elicited a desirable response from the class. A guided discovery technique was employed to force the teacher-trainee to rely upon feedback sequences and supporting records in his self-evaluation.

Subjects were randomly selected from a Junior level Elementary Bloc sequence at Michigan State University with a population of 156 subjects. All of these subjects were not eligible to participate in the study because a transfer test was to be given during the student teaching assignment, i. e., the subject must be eligible and registered for student teaching during the following quarter. Sixty subjects were randomly selected from the eligible or "adjusted" population of 107 students.

Several instruments were designed and tested. A post-test instrument was designed to measure the effectiveness of the simulator treatment. The instrument was designed to measure a teacher-trainee's response on three factors: (1) the assessment of the problem; (2) the awareness of a principle or principles to apply in solving the problem; and (3) the physical and verbal response used in solving the problem. Eleven principles were utilized in solving problems pertaining to five behaviors. The principles were developed and tested in a previous study by Bert Y. Kersh and served as the standards or criteria for this study. A Pearson-Product-Moment-Correlation between two observers produced a coefficient of observer agreement of .63 with the post-test instrument.

The second instrument designed and tested was an Observational Record Form to measure the transfer effect of the treatment. This instrument required the observers to: (1) place a tally after each occurence of five specific behaviors; (2) place a tally in a column if the student-teacher was aware of the occurance; (3) place another tally in the appropriate column answering the questions, "How Did the Student Teacher Handle the Situation:--Adequately, Acceptable, or Inadequately;" (5) record the number representing each principle the student teacher applied in solving the specific behavior problem; and (5) record the number representing each principle applied generally but not to any specific behavior. Coefficient correlations of observer agreement of .67 to .96 were obtained with three observers after training on all but one column of the Observational Record Form. The coefficient correlations of observer agreement are summarized in Table 2.

A nine-question, four point scale, similar to a Likert Scale, was devised to measure a teacher-trainee's level of confidence in his ability to teach based upon the skills and behaviors experienced within the classroom simulator.

To determine the attitudes the teacher-trainees held toward their classroom simulator experience, a "Student Reaction to Simulator Training" instrument was also constructed.

Three statistical hypotheses were formulated to obtain answers to the following questions:

1. Can desirable teacher classroom behaviors be developed through classroom simulation experience?

2. Will these developed behaviors transfer into practice during the student teaching experience?

3. Can a student's confidence in his ability to teach be raised through classroom simulation experience?

A two-factorial design was employed with an experimental and control group divided by high and low GPA's. The experimental group received nine hours of classroom simulator experience while the control group received only an orientation session. Both groups were administered an identical post-test in the simulator at the end of the quarter.

The post-test was analyzed by a Fixed Effects Two-Way Analysis of Variance. Chi-square and z-tests were used to analyze the transfer test data. An Analysis of Variance was again used with the Confidence Scale data. The "Student Reactions to Simulator Training" instrument responses were reported descriptively.

CHAPTER IV

ANALYSIS OF RESULTS

A compilation of the findings of the study are reported in this chapter. The effect of the simulator treatment (1) immediately after the experience as measured by a post-test, (2) in transfering into use during the teacher-trainees student teaching experience as measured by an Observational Record Form and, (3) the teacher-trainee's confidence in his ability to teach will be reported.

Findings of the Study

The first hypothesis tested in this study was:

H_{o1}: No differences exist between the means of groups provided with and without classroom simulator experience in their ability to correctly respond, assess, and apply principles to representative classroom problems as measured by a simulator post-test.

Symbolically: $H_{o_1}: M_1 = M_2$

A post-test was designed to provide evidence for this hypothesis. The test was divided into three sections: (1) response to the problem, (2) assessment of the problem, and (3) application of the principles in solving the problems as was previously discussed in Chapter III. .

In responding to the problems the control group mean score was 37.06 with a standard deviation of 9.47 while the experimental group mean was 43.06 and standard deviation 6.03. The experimental group mean score was 6.0 points higher than the control group and the standard deviation was 3.44 points lower. Small differences existed between the means and standard deviations of the high and low subgroups. (Table 10.)

TABLE 10.--Comparison of the means and standard deviations of the experimental and control groups on the response section of the post-test.

	Experimental Group*			Control Group*		
	High	Low	Entire Group	High	Low	Entire Group
Mean	43.4	42.73	43.06	37.93	36.2	37.06
Standard Deviation	3.85	4.62	6.03	5.90	7.35	9.47

*N = 30.

An analysis of variance was used to determine the differences between the post-test response score means of the two groups and also if differences existed between the high and low GPA groups. An "F" value of 8.33 was computed for the treatment effect (simulator experience) which was significant @ alpha .01 level of confidence $F \geq 7.12$. No level effects (high and low GPA) were present. (Table 11.)

TABLE 11.--Analysis of variance of post-test response score means between experimental and control groups.

Source	SS	df	MS	F
Treatment	540	1	540	8.33*
Levels	21.60	1	21.60	
Interaction	4.26	1	4.26	
Error	3627.14	56	64.77	

F is significant if F $\geq$ 7.12 @ .01 level of confidence.

*Significant, $p < .01$

Both groups assessed the problems with approximately equal success. The control group mean score was 22.33 and the experimental group mean was 24.07 for a small gain of 1.74 points. The standard deviations were 4.14 and 4.13 respectively. Differences between the means and standard deviations of the subgroups were again small. (Table 12.)

TABLE 12.--Comparison of the means and standard deviations of the experimental and control groups on the assessment section of the post-test.

	Experimental Group*			Control Group*		
	High	Low	Entire Group	High	Low	Entire Group
Mean	24.80	23.33	24.07	22.13	22.53	22.33
Standard Deviation	3.75	4.50	4.13	4.42	3.99	4.14

*N = 30.

An analysis of variance revealed an "F" of 2.58 for the treatment effect (simulator experience) which was not significant at the alpha .01 or .05 levels of confidence. No level effects (high and low GPA) were present. (Table 13.)

TABLE 13.--Analysis of variance of post-test assessment score means between experimental and control groups.

Source	SS	df	MS	F
Treatment	45	1	45	2.58*
Levels	4.27	1	4.27	
Interaction	13.13	1	13.13	
Error	977.20	56	17.45	

F is significant if F $\geq$ 4.02 @ alpha .05 level of confidence.
*Not Significant

Large differences existed between the means of the experimental and control groups on being aware of principles to apply for solving simulated classroom problems. The experimental group mean score of 17.27 was 7.30 points higher than the control group mean of 9.97. The experimental group standard deviation of 4.89 was 1.40 points lower than the control group standard deviation, 6.29. Again, only small differences existed between the high and low subgroup means and standard deviation. (Table 14.)

Analysis of the data on principles applied in solving the problems by analysis of variance produced a significant "F" value of 24.5. The "F" value needed for significance

TABLE 14.--Comparison of the means and standard deviations of the experimental and control groups on the principles section of the post-test.

	Experimental Group*			Control Group*		
	High	Low	Entire Group	High	Low	Entire Group
Mean	17.93	16.60	17.27	10.20	9.73	9.97
Standard Deviation	4.13	5.62	4.89	5.99	6.79	6.29

*N = 30.

at the alpha .01 level of confidence was $\geq$ 7.12. (Table 15.) Again, no significant differences existed for levels effect (high and low GPA).

TABLE 15.--Analysis of variance of post-test principles applied score means between experimental and control groups.

Source	SS	df	MS	F
Treatment	800	1	800	24.5*
Levels	12	1	12	
Interaction	3	1	3	
Error	1828	56	32.64	

F is significant if F $\geq$ 7.12 @ .01 level of confidence.

*Significant, $p < .01$

On the basis of the preceding evidence, the first hypothesis tested that the means of groups provided with and without simulator experience in correctly responding, assessing, and applying principles to problems would be equal is rejected.

The second hypothesis tested was:

H_{o_2}: The proportions of subjects in groups provided with and without classroom simulator experience correctly identifying, responding, and applying principles as measured by the Observational Record Form during the teacher-trainees student teaching assignment will be equal.

Symbolically: $H_{o_2}: P_1 = P_2$

To test this hypothesis, three research assistants were trained to use an Observational Record Form as was previously explained in Chapter Three. In addition to these observations, each student teacher's university co-ordinating professor and classroom supervising teacher also made observations using the same Observational Record Form. These observations were scheduled during the fourth week of the student teaching assignment.

The first two columns of the Observational Record Form ("Behavior Occurred in Class" and "Student Teacher Aware") produced a ratio of student teacher awareness to behavior occurred for each behavior experienced in the simulator. The frequencies of occurrence, student teacher awareness, and their ratios as recorded by the trained observers are summarized in Table 16.

TABLE 16.--Comparison of frequencies of occurrance, student teacher awareness, and their ratios between experimental and control groups during the student teaching experience as recorded by trained observers.

Behavior		Experimental Group (N = 28)			Control Group (N = 30)		
		Behavior Occurred	Student Teacher Aware	Ratio	Behavior Occurred	Student Teacher Aware	Ratio
Inattention	High	101	24	.237	136	31	.227
	Low	127	33	.259	123	27	.219
	Total	228	57	.254	259	58	.223
Baiting and Testing	High	28	14	.500	64	24	.375
	Low	24	14	.583	29	20	.689
	Total	52	28	.538	93	44	.473
Disorderly Conduct	High	62	38	.612	81	37	.456
	Low	38	27	.710	54	37	.685
	Total	100	65	.650	135	74	.548
Distracting Behavior	High	135	50	.370	182	66	.362
	Low	168	59	.351	112	54	.482
	Total	303	109	.359	294	120	.408
Fatigue	High	11	2	.181	5	2	.400
	Low	14	3	.214	16	3	.187
	Total	25	5	.200	21	5	.238
TOTALS		708	264	.372	802	301	.375

Analysis of these proportions by the z-test for proportions revealed no significant differences between the experimental and control groups on any of the behaviors. (Table 17.)

TABLE 17.--Comparison of behavior occurred--student teacher awareness ratios and z-test values between experimental and control groups during the student teaching experience as recorded by the trained observers.

Behaviors	Experimental Group Ratio	Control Group Ratio	z* (Absolute Values)
Inattention	.254	.223	.68
Baiting and Testing	.538	.473	.53
Disorderly Conduct	.650	.548	1.22
Distracting Behavior	.359	.408	(-) 1.22
Fatigue	.200	.238	(-) .26
TOTAL	.372	.375	(-) .10

*z Value significant if $\geq$ 1.96 @ alpha .05 level of confidence.

*z Value significant if $\geq$ 2.58 @ alpha .01 level of confidence.

The university coordinating professors made one one-hour observation of each of their student teachers who were involved in the study. The frequencies of occurrence student teacher awareness, and their corresponding ratios are summarized in Table 18.

TABLE 18.--Comparison of frequencies of occurrence, student teacher awareness, and their ratios between experimental and control groups during the student teaching experience as recorded by the university coordinating professors.

Behavior		Experimental Group (N = 17)			Control Group (N = 21)		
		Behavior Occurred	Student Teacher Aware	Ratio	Behavior Occurred	Student Teacher Aware	Ratio
Inattention	High	27	12		57	39	
	Low	44	19		73	42	
	Total	71	31	.436	130	81	.623
Baiting and Testing	High	6	5		29	24	
	Low	0	0	.833	16	14	.844
	Total	6	5		45	38	
Disorderly Conduct	High	7	6		14	6	
	Low	7	4		14	9	
	Total	14	10	.714	28	15	.536
Distracting Behavior	High	35	24		32	20	
	Low	26	16		33	19	
	Total	61	40	.656	65	39	.600
Fatigue	High	12	5		23	15	
	Low	3	1		29	17	
	Total	15	6	.400	52	32	.615
TOTALS		167	92	.551	320	205	.541

A z-test for proportions revealed one significant difference between the experimental and control groups--the behavior of Inattention--as recorded by the university coordinating professors. (Table 19.)

TABLE 19.--Comparison of behavior occurred--student teacher awareness ratios and z-test values between experimental and control groups during the student teaching experience as recorded by the university coordinating professors.

Behaviors	Experimental Group Ratio	Control Group Ratio	z* (Absolute Values)
Inattention	.436	.623	(-) 2.44**
Baiting and Testing	.833	.844	.07
Disorderly Conduct	.714	.536	1.11
Distracting Behaviors	.656	.600	.65
Fatigue	.400	.615	(-) 1.48
TOTAL	.551	.641	(-) 1.93

*z Value significant if $\geq$ 1.96 @ alpha .05 level of confidence.

z Value significant if $\geq$ 2.58 @ alpha .01 level of confidence.

**Significant, $p < .05$.

The classroom supervising teachers completed five-thirty minute observations during the fourth and fifth week of each subjects student teaching experience. The frequencies of occurrence, student teacher awareness, and their corresponding ratios as recorded by the classroom supervising teachers are reported in Table 20.

Analysis of these proportions by a z-test revealed significant differences as recorded by the classroom supervising teachers between the experimental and control groups on total behaviors and on the individual behaviors of Inattention and Baiting and Testing. (Table 21.)

The next three columns of the Observational Record Form provided a place for each observer to record the effectiveness of the student teacher's response as being adequate, acceptable, or inadequate. The frequencies with which these responses were recorded by the trained observers, coordinating professors, and supervising teachers as adequate, acceptable, or inadequate for each behavior are summarized in Tables 22, 23, and 24.

The Chi-square was used to analyze the effectiveness of student teacher responses--the frequencies recorded by the trained observers, college coordinating professors, and classroom supervising teachers. Whenever the N/cell was too small for analysis by Chi-Square, the Fisher Exact Probability Test was employed. Analysis of the frequencies with which the responses were recorded by the trained observers in each cell revealed that no significant differences existed between the two groups. (Table 25.)

Analysis of the frequencies recorded by the university coordinating professors revealed significant differences on

TABLE 20.--Comparison of frequencies of occurrence, student teacher awareness, and their ratios between experimental and control groups during the student teaching experience as recorded by the classroom supervising teachers.

Behavior		Experimental Group (N = 27)			Control Group (N = 28)		
		Behavior Occurred	Student Teacher Aware	Ratio	Behavior Occurred	Student Teacher Aware	Ratio
Inattention	High	268	89		167	101	
	Low	213	118		234	118	
	Total	481	207	.430	401	219	.546
Baiting and Testing	High	40	34		62	45	
	Low	41	41		69	48	
	Total	81	75	.925	131	93	.709
Disorderly Conduct	High	64	43		49	35	
	Low	9	9		47	38	
	Total	73	52	.712	96	73	.760
Distracting Behavior	High	220	116		151	108	
	Low	184	126		251	136	
	Total	404	242	.599	402	244	.606
Fatigue	High	26	9		37	12	
	Low	45	23		21	11	
	Total	71	32	.450	58	23	.396
TOTALS		1110	608	.547	1088	652	.599

TABLE 21.--Comparison of z-test values of behavior occurred-student teacher awareness ratios between experimental and control groups during the student teaching experience as recorded by the classroom supervising teachers.

Behaviors	Experimental Group Ratio	Group Group Ratio	z* (Absolute Values)
Inattention	.430	.546	(-) 3.43**
Baiting and Testing	.925	.709	3.76**
Disorderly Conduct	.712	.760	(-) .71
Distracting Behavior	.599	.606	(-) .23
Fatigue	.450	.396	.62
TOTAL	.547	.599	(-) 2.47***

*z Values significant if $\geq$ 1.96 @ alpha .05 level of confidence.

*z Values significant if $\geq$ 2.58 @ alpha .01 level of confidence.

**Significant, $p < .01$.
***Significant, $p < .05$.

TABLE 22.--Comparison of the effectiveness of student teacher responses to classroom problems between experimental and control groups as recorded by trained observers.

Behaviors		Experimental Group (N = 28)				Control Group (N = 30)			
		Adeq.	Accept.	Inad.	Total Resp.	Adeq.	Accept.	Inad.	Total Resp.
Inattention	High	8	10	5	23	7	19	2	28
	Low	11	15	5	31	10	12	3	25
	Total	19	25	10	54	17	31	5	53
Baiting and Testing	High	4	6	4	14	4	6	11	21
	Low	1	6	6	13	4	10	6	20
	Total	5	12	10	27	8	16	17	41
Disorderly Conduct	High	14	13	9	36	7	16	14	37
	Low	5	12	8	25	20	10	9	39
	Total	19	25	17	61	27	26	23	76
Distracting Behavior	High	23	17	1	41	19	28	19	66
	Low	21	23	9	53	24	26	5	55
	Total	44	40	10	94	43	54	24	121
Fatigue	High	1	1	0	2	1	0	1	2
	Low	0	2	1	3	3	0	0	3
	Total	1	3	1	5	4	0	1	5
TOTALS		88	105	48	241	99	127	70	296

NOTE: Adeq. = Adequate; Accept. = Acceptable; Inad. = Inadequate; Resp. = Response.

TABLE 23.--Comparison of the effectiveness of student teacher responses to classroom problems between experimental and control groups as recorded by university coordinating professors.

Behaviors		Experimental Group (N = 17)				Control Group (N = 21)			
		Adeq.	Accept.	Inad.	Total Resp.	Adeq.	Accept.	Inad.	Total Resp.
Inattention	High	5	5	3	13	11	17	9	37
	Low	9	4	5	18	21	15	4	40
	Total	14	9	8	31	32	32	13	77
Baiting and Testing	High	2	2	0	4	10	10	3	23
	Low	0	0	0	0	10	2	2	14
	Total	2	2	0	4	20	12	5	37
Disorderly Conduct	High	5	0	0	5	1	6	4	11
	Low	3	0	2	5	3	3	1	7
	Total	8	0	2	10	4	9	5	18
Distracting Behavior	High	18	3	2	23	4	7	7	18
	Low	10	4	0	14	13	7	11	31
	Total	28	7	2	37	17	14	18	49
Fatigue	High	5	0	1	6	8	1	2	11
	Low	1	0	0	1	8	4	1	13
	Total	6	0	1	7	16	5	3	24
TOTALS		58	18	13	89	89	72	44	205

NOTE: Adeq. = Adequate; Accept. = Acceptable; Inad. = Inadequate; Resp. = Response

TABLE 24.--Comparison of the effectiveness of student teacher responses to classroom problems between experimental and control groups as recorded by classroom supervising teachers.

Behaviors		Experimental Group (N = 27)				Control Group (N = 28)			
		Adeq.	Accept.	Inad.	Total Resp.	Adeq.	Accept.	Inad.	Total Resp.
Inattention	High	57	24	4	85	54	32	11	97
	Low	73	49	8	130	81	23	10	114
	Total	130	73	12	215	135	55	21	211
Baiting and Testing	High	22	8	5	35	12	16	16	44
	Low	22	13	2	37	27	12	6	45
	Total	44	21	7	72	39	28	22	89
Disorderly Conduct	High	29	10	5	44	21	8	2	31
	Low	6	3	0	9	24	5	5	34
	Total	35	13	5	53	45	13	7	65
Distracting Behavior	High	72	32	8	112	57	29	19	105
	Low	72	42	6	120	96	21	12	129
	Total	144	74	14	232	153	50	31	234
Fatigue	High	4	4	1	9	9	3	0	12
	Low	10	10	2	22	8	2	1	11
	Total	14	14	3	31	17	5	1	23
TOTALS		367	195	41	603	389	151	82	622

NOTE: Adeq. = Adequate; Accept. = Acceptable; Inad. = Inadequate; Resp. = Response

TABLE 25.--Comparison of the Chi-Squares on effectiveness of student teacher responses between experimental and control groups as recorded by trained observers.

	Experimental Group (N = 28)			Control Group (N = 30)			
	Adeq.	Accept.	Inad.	Adeq.	Accept.	Inad.	Chi-Square*
Inattention	19	25	10	17	31	5	2.60
Baiting and Testing	5	12	10	8	16	17	.32
Disorderly Conduct	19	25	17	27	26	23	.68
Distracting Behavior	44	40	10	43	54	24	4.54
Fatigue	1	3	1	4	0	1	p = .55**
TOTALS	88	105	48	99	127	70	.77

NOTE: Adeq. = Adequate; Accept. = Acceptable; Inad. = Inadequate; Resp. = Response
*Chi-Square Significant if $\geq$ 7.82 @ alpha .01 level of confidence-one tail, 2 d.f.
Significant if $\geq$ 4.60 @ alpha .05 level of confidence-one tail, 2 d.f.
**Fisher Exact Probability Test
Significant if $p \leq .05$

total behaviors and distracting behavior between the experimental and control groups on the effectiveness of their responses. (Table 26.)

Significant differences were found between the experimental and control groups on the frequencies recorded by the classroom supervising teachers pertaining to the student teacher's effectiveness in responding to classroom problems. The effectiveness of responses totaled over all behaviors was significant as were the responses to the individual behaviors of inattention, baiting and testing, and distracting behavior. (Table 27.)

The sixth column of the Observational Record Form was designed to obtain evidence to indicate if the principles developed and applied during the simulator experience would transfer into application during the student teaching experience. The applied principles were recorded by placing its respective number on the Observational Record Form. If the student teacher handled the situation adequately or acceptably (columns 3 and 4) then the principle was considered correctly applied.

The total number of principles applied to each category--adequate, acceptable, and inadequate--by the trained observers, university coordinating professors, and classroom supervising teachers are summarized in Tables 28, 29, and 30.

TABLE 26.--Comparison of the Chi-Squares on effectiveness of student teacher responses between experimental and control groups as recorded by university coordinating professors.

Behaviors	Experimental Group (N = 17)			Control Group (N = 21)			
	Adeq.	Accept.	Inad.	Adeq.	Accept.	Inad.	Chi-Square*
Inattention	14	9	8	32	32	13	1.89
Baiting and Testing	2	2	0	20	12	5	p = .36**
Disorderly Conduct	8	0	2	4	9	5	p = .65**
Distracting Behavior	28	7	2	17	14	18	16.45***
Fatigue	6	0	1	16	5	3	p = .45**
TOTALS	58	18	13	89	72	44	11.87***

NOTE: Adeq. = Adequate; Accept. = Acceptable; Inad. = Inadequate; Resp. = Response
*Chi-Square Significant if $\geq$ 7.82 @ alpha .01 level of confidence-one tail, 2 d.f.
Significant if $\geq$ 4.60 @ alpha .05 level of confidence-one tail, 2 d.f.
**Fisher Exact Probability Test (N/cell too small for x^2).
Significant if $p \leq .05$
***Significant, $p < .01$

TABLE 27.--Comparison of the Chi-Squares on effectiveness of student teacher responses between experimental and control groups as recorded by classroom supervising teachers.

	Experimental Group (N = 27)			Control Group (N = 28)			
Behaviors	Adeq.	Accept.	Inad.	Adeq.	Accept.	Inad.	Chi-Square*
Inattention	130	73	12	135	55	21	5.04**
Baiting and Testing	44	21	7	39	28	22	7.35**
Disorderly Conduct	35	13	5	45	13	7	.36
Distracting Behavior	144	74	14	153	50	31	11.33***
Fatigue	14	14	3	17	5	1	4.46
TOTALS	367	195	41	389	151	82	19.62***

NOTE: Adeq. = Adequate; Accept. = Acceptable; Inad. = Inadequate; Resp. = Response
*Chi-Square Significant if $\geq$ 7.82 @ alpha .01 level of confidence-one tail, 2 d.f.
Significant if $\geq$ 4.60 @ alpha .05 level of confidence-one tail, 2 d.f.
**Significant, $p < .05$
***Significant, $p < .01$

TABLE 28.--Comparison of the principles applied to solve classroom problems by student teachers between experimental and control groups as recorded by trained observers.

Behaviors		Number of Principles Applied					
		Experimental Group (N - 28)			Control Group (N = 30)		
		Applied Correctly	Applied Incorrectly	Total Applied	Applied Correctly	Applied Incorrectly	Total Applied
Inattention	High	33	16	49	45	4	49
	Low	58	12	70	47	5	52
	Total	91	28	119	92	9	101
Baiting and Testing	High	20	4	24	25	10	35
	Low	12	10	32	23	6	29
	Total	32	14	46	47	16	63
Disorderly Conduct	High	58	13	71	35	17	52
	Low	34	13	47	55	1	56
	Total	92	26	118	100	18	118
Distracting Behavior	High	92	18	110	99	24	123
	Low	104	12	116	96	4	100
	Total	196	30	226	195	28	223
Fatigue	High	7	0	7	1	2	3
	Low	4	1	5	7	0	7
	Total	11	1	12	8	2	10
TOTALS		422	99	521	442	73	515

TABLE 29.--Comparison of the principles applied to solve classroom problems by student teachers between experimental and control groups as recorded by university coordinating professors.

Behaviors		Number of Principls Applied					
		Experimental Group (N=17)			Control Group (N=21)		
		Applied Correctly	Applied In-correctly	Applied	Correctly	Applied In-correctly	Total Applied
Inattention	High	14	5	19	22	5	27
	Low	19	3	22	23	0	23
	Total	33	8	41	45	5	50
Baiting and Testing	High	3	0	3	23	1	24
	Low	0	0	0	8	1	9
	Total	3	0	3	31	2	33
Disorderly Conduct	High	6	0	6	10	1	11
	Low	3	0	3	4	0	4
	Total	9	0	9	14	1	15
Distracting Behavior	High	21	2	23	19	12	31
	Low	17	2	19	4	0	4
	Total	38	4	42	23	12	35
Fatigue	High	6	1	7	3	0	3
	Low	2	0	2	7	0	7
	Total	8	1	9	10	0	10
TOTALS		91	13	104	123	20	143

TABLE 30.--Comparison of the principles applied to solve classroom problems by student teachers between experimental and control groups as recorded by classroom supervising teachers.

Behaviors		Number of Principles Applied					
		Experimental Group (N = 27)			Control Group (N = 28)		
		Applied Correctly	Applied Incorrectly	Total Applied	Applied Correctly	Applied Incorrectly	Total Applied
Inattention	High	70	3	73	107	11	118
	Low	167	0	167	97	2	99
	Total	237	3	240	204	13	217
Baiting and Testing	High	29	6	35	29	20	49
	Low	48	0	48	38	2	40
	Total	77	6	83	67	22	89
Disorderly Conduct	High	39	2	41	29	2	31
	Low	12	0	12	19	3	22
	Total	51	2	53	48	5	53
Distracting Behavior	High	87	3	90	99	14	113
	Low	168	9	177	94	7	101
	Total	255	12	267	193	21	214
Fatigue	High	5	0	5	8	0	8
	Low	25	0	25	6	0	6
	Total	30	0	30	14	0	14
TOTALS		650	23	673	526	61	587

The Chi-Square test was again used to test if any differences existed between the frequency with which principles were applied correctly and incorrectly between the two groups as observed by the three groups of observers. Significant differences were found between the two groups by the trained observers. The observed Chi-Square required for significance @ alpha .05 level of confidence was $\geq$ 2.71. The observed Chi-Square for total behaviors was 4.02. Significant differences were found between the experimental and control groups on only one individual behavior, inattention, which had an observed Chi-Square of 7.30. This was significantly greater than the required Chi-Square of 5.41 @ alpha .01 level of confidence. (Table 31.)

The university coordinating professors found a significant difference on one behavior, distracting behavior. (Table 32.) Significant differences were recorded by the classroom supervising teachers on all behaviors except two, disorderly conduct and fatigue. (Table 33.)

The seventh and last column of the Observational Record form was used to record the principles generally applied by student teachers but not applied to any of the five specific behaviors. No test of significance was attempted with this data. The trained observers recorded 312 principles (51% of total) applied generally by the experimental group and 298 (49% of total) by the control group. (Table 34.)

TABLE 31.--Comparison of Chi-Squares on principles applied correctly by student teachers between experimental and control groups as recorded by trained observers.

Behaviors	Experimental Group (N = 28)		Control Group (N = 30)		
	Applied Correctly	Applied Incorrectly	Applied Correctly	Applied Incorrectly	Chi-Square
Inattention	91	28	92	9	7.30*
Baiting and Testing	32	14	47	16	.10
Disorderly Conduct	92	26	100	18	1.30
Distracting Behavior	196	30	195	28	.70
Fatigue	11	1	8	2	p = .35***
TOTALS	422	99	442	73	4.02**

Chi-Square Significant if $\geq$ 5.41 @ alpha .01 level of confidence-one tail, 1 d.f.
Significant if $\geq$ 2.71 @ alpha .05 level of confidence-one tail, 1 d.f.

*Significant, < .01

**Significant, < .05

***Fisher Exact Probability Test,
Significant if $\leq$ .05

TABLE 32.--Comparison of Chi-Squares on principles applied correctly by student teachers between experimental and control groups as recorded by university coordinating professors.

Behaviors	Experimental Group (N = 17)		Control Group (N = 21)		
	Applied Correctly	Applied Incorrectly	Applied Correctly	Applied Incorrectly	Chi-* Square
Inattention	33	8	45	5	.98
Baiting and Testing	3	0	31	2	p = .84**
Disorderly Conduct	9	0	14	1	p = .63**
Distracting Behavior	38	4	23	12	5.69***
Fatigue	8	1	10	0	p = .47**
TOTALS	91	13	123	20	.0001

*Chi-Square Significant if $\geq$ 5.41 @ alpha .01 level of confidence-one tail, 1 d.f.
Significant if $\geq$ 2.71 @ alpha .05 level of confidence-one tail, 1 d.f.
**Fisher Exact Probability Test
Significant if $p \leq .05$
***Significant, $< .01$

TABLE 33.--Comparison of Chi-Squares on principles applied correctly by student teachers between experimental and control groups as recorded by classroom supervising teachers.

Behaviors	Experimental Group (N = 27)		Control Group (N = 28)		
	Applied Correctly	Applied Incorrectly	Applied Correctly	Applied Incorrectly	Chi-Square*
Inattention	237	3	204	13	6.00***
Baiting and Testing	77	6	67	22	8.30***
Disorderly Conduct	51	2	48	5	.61
Distracting Behavior	255	12	193	21	4.00****
Fatigue	30	0	14	0	p = 1.00**
TOTALS	650	23	526	61	21.00***

*Chi-Square Significant if $\geq$ 5.41 @ alpha .01 level of confidence-one tail; 1 d.f.
Significant if $\geq$ 2.71 @ alpha .05 level of confidence-one tail, 1 d.f.

**Fisher Exact Probability Test
Significant if $p \leq .05$

***Significant, < .01

****Significant, < .05

TABLE 34.--Comparison of principles applied but not to specific behaviors experienced in the simulator between experimental and control groups as recorded by the trained observers.

	Experimental Group (N = 28)		Control Group (N = 30)	
	Frequency	Per cent*	Frequency	Per cent*
High	163	27%	140	23%
Low	149	24%	158	26%
Total	312	51%	298	49%

*Percentages calculated from total principles applied by both groups (312 + 298 = 610).

Eighty-five principles (67% of total) were applied by the experimental group and 41 (33% of total) by the control group as recorded by the university coordinating professors. (Table 35.)

TABLE 35.--Comparison of principles applied but not to specific behaviors experienced in the simulator between experimental and control groups as recorded by the university coordinating professors.

	Experimental Group (N = 17)		Control Group (N = 21)	
	Frequency	Per cent*	Frequency	Per cent*
High	29	23%	8	6%
Low	56	44%	33	27%
Total	85	67%	41	33%

*Percentages calculated from total principles applied by both groups (85 + 41 = 126).

The classroom supervising teachers observed 528 principles (67% of total) applied generally by the experimental group and 258 (33% of total) by the control group. (Table 36.)

On the basis of the above evidence, the second hypothesis tested that the proportion of subjects in groups provided with and without classroom simulator experience correctly identifying, responding, and applying principles as measured by the Observational Record Form will be equal is not rejected. This decision is based upon the

TABLE 36.--Comparison of principles applied but not to specific behaviors experienced in the simulator between experimental and control groups as recorded by the classroom supervising teachers.

	Experimental Group (N = 27)		Control Group (N = 28)	
	Frequency	Per cent*	Frequency	Per cent*
High	261	33%	83	11%
Low	267	34%	175	22%
Total	528	67%	258	33%

*Percentages calculated from total principles applied by both groups (528 + 258 = 786).

evidence as recorded by the trained observers where significant inter-observer reliability coefficients were obtained.

The third hypothesis tested was:

H_{O_3}: No differences will exist between the confidence level mean scores of subjects receiving and not receiving classroom simulator experience pertaining to their ability to teach.

Symbolically: H_{O_3}: $M_1 = M_2$

To test this hypothesis a confidence scale was designed relating specifically to behaviors and principles experienced within the classroom simulator. Pre-tests and post-tests were administered to both the experimental and control groups.

The experimental and control group pre-test means were approximately equal, 23.21 and 24.82 respectively, with standard deviations of 3.28 and 2.86. Pre- and post-test means and standard deviations are summarized in Tables 37 and 38.

An analysis of variance of the pre-test data revealed no significant differences between the means of the two groups before simulator experience. (Table 39.)

After the classroom simulator experience, difference scores were obtained by subtracting post-test scores from each subject's pre-test score.

The experimental group difference mean was 5.60 with a standard deviation of 3.59 and the control group mean was 3.04 with a standard deviation of 3.16. The difference score means and standard deviations are summarized in Table 40.

An analysis of variance using the difference scores between the pre- and post-tests revealed significant differences between the experimental and control groups. An "F" value equal to or greater than 7.17 was needed for significance @alpha .01 level of confidence. An "F" value of 7.93 was found. (Table 41.)

Based upon the evidence, the third hypothesis tested that no differences will exist between the ability-to-teach confidence level mean scores between subjects receiving and not receiving simulator experience is rejected.

To determine the attitude of the subjects in the experimental group toward their simulator experience a

TABLE 37.--Comparison of the means and standard deviations of the experimental and control groups on confidence scale pre-test.

	Experimental Group			Control Group		
	High	Low	Entire Group	High	Low	Entire Group
Mean (X)	22.57	23.86	23.21	24.21	25.43	24.82
Standard Deviation (s)	1.65	4.33	3.28	2.94	2.74	2.86

TABLE 38.--Comparison of the means and standard deviations of the experimental and control groups on confidence scale post-test.

	Experimental Group			Control Group		
	High	Low	Entire Group	High	Low	Entire Group
Mean ($\bar{X}$)	27.64	30.00	28.82	26.93	28.79	27.86
Standard Deviation (s)	2.84	3.96	3.59	3.45	4.21	3.89

TABLE 39.--Analysis of variance of differences between experimental and control groups pre-test level of confidence mean scores.

Source	SS	df	MS	F*
Treatment	36.16	1	36.16	3.85
Levels	21.88	1	21.88	2.33
Interaction	.02	1	.02	
Error	488.30	52	9.40	

*Significant if $F \geq 7.17$ @ alpha .01 level of confidence.
Significant if $F \geq 4.03$ @ alpha .05 level of confidence.

TABLE 40.--Comparison of the pre- and post-Test difference score means and standard deviations of the experimental and control groups.

	Experimental Group			Control Group		
	High	Low	Entire Group	High	Low	Entire Group
Mean ($\overline{X}$)	5.07	6.14	5.60	2.71	3.36	3.04
Standard Deviation (s)	2.97	4.17	3.59	2.30	3.89	3.16

TABLE 41.--Analysis of variance between experimental and control groups using pre-test and post-test level of confidence differences scores.

Source	SS	df	MS	F*
Treatment	92.57	1	92.57	7.93**
Levels	10.29	1	10.29	
Interaction	.64	1	.64	
Error	606.72	52	11.67	

*Significant if $F \geq 7.17$ @ alpha .01 level of confidence.
**Significant, $p \leq .01$.

"Student Reaction to Simulator Training" questionnaire was designed. This instrument was based upon the behaviors and principles experienced by the subjects within the simulator. The instrument was administered immediately after the simulator experience. Because the teacher-trainee would not have had any classroom experience upon which to base his feelings about the effectiveness of the simulator experience prior to student teaching, the "Student Reaction to Simulator Training" was administered again during the fourth week of the student teaching experience. The results of the attitude questionnaire are stated descriptively both as percentage and frequencies:

1. I enjoyed receiving training in the classroom simulator.

After Simulation Experience			During Student Teaching Assignment	
72%	21	a. Very much so	57%	12
24%	7	b. Somewhat	38%	8
4%	1	c. Not particularly	5%	1
0%	0	d. Not at all	0%	0

2. The classroom simulator was realistic--"life like."

6%	2	a. Very realistic	9.5%	2
43%	13	b. Realistic	48%	10
37%	11	c. Not particularly realistic	33%	7
14%	4	d. Not realistic at all	9.5%	2

3. "Acting out" my response to the problems made me feel like I was involved in the situation.

After Simulation Experience				During Student Teaching Assignment	
7%	2	a.	Very involved	14%	3
33%	10	b.	Involved	48%	10
60%	18	c.	Not particularly involved	24%	5
0%	0	d.	Not involved at all	14%	3

4. The discussion accompanying training was valuable in developing the concepts.

73%	22	a.	Very valuable	62%	13
27%	8	b.	Valuable	33%	7
0%	0	c.	Not particularly valuable	5%	1
0%	0	d.	Not valuable at all	0%	0

5. I believe that the simulator experience was meaningful in its relation to real classroom problems.

45%	13	a.	Very meaningful	33%	7
55%	16	b.	Meaningful	62%	13
0%	0	c.	Not particularly meaningful	5%	1
0%	0	d.	Not meaningful at all	0%	0

6. I feel that my experience in the classroom simulator will help me to identify classroom problems.

57%	17	a.	Very helpful	43%	9
40%	12	b.	Helpful	43%	9
3%	1	c.	Not particularly helpful	9%	2
0%	0	d.	Not helpful at all	5%	1

7. I believe that my experience in the classroom simulator has helped me develop methods of coping with classroom problems.

After Simulation Experience				During Student Teaching Assignment	
52%	15	a.	Very helpful	38%	8
41%	12	b.	Helpful	48%	10
3.5%	1	c.	Not particularly helpful	9%	2
3.5%	1	d.	Not helpful at all	5%	1

8. The classroom simulator made the concepts more meaningful than if they had been presented in lectures.

69%	20	a.	Much more meaningful	52%	11
28%	8	b.	More meaningful	38%	8
3%	1	c.	As meaningful	10%	2
0%	0	d.	Less meaningful	0%	0
0%	0	e.	Much less meaningful	0%	0

9. I believe that the classroom simulator experience should be provided on an individual basis.

52%	15	a.	Strongly agree	52%	11
43%	13	b.	Agree	38%	8
5%	1	c.	Disagree	10%	2
0%	0	d.	Strongly disagree	0%	0

10. I believe that the classroom simulator experience could be provided to small groups (up to six students) just as effectively.

3%	1	a.	Strongly agree	5%	1
17%	5	b.	Agree	29%	6
48%	14	c.	Disagree	48%	10
32%	9	d.	Strongly disagree	18%	4

11. I believe the classroom simulator experience could be provided to an entire class (40 to 60 students) just as effectively.

0%	0	a.	Strongly agree	0%	0
3%	1	b.	Agree	5%	1
21%	6	c.	Disagree	38%	8
76%	22	d.	Strongly disagree	57%	12

12. I would recommend classroom simulator experience to my friends.

38%	11	a.	Strongly recommend	38%	8
62%	18	b.	Recommend	57%	12
0%	0	c.	Advise against	0%	0
0%	0	d.	Strongly advise against	0%	0

Discussion of the Findings

The immediate effect of the classroom simulator as measured by the post-test is that it is effective as a method of providing classroom experiences to teacher-trainees prior to their student teaching experience. Teacher-trainees receiving classroom simulator experience were better able to identify, solve, and apply principles to solve classroom problems than were teacher-trainees not receiving the experience. The "F: values found were large and significant beyond the $p < .01$ level. A subject's previous success in classes as indicated by his all-university grade point average seemed to have no effect on successful performance within the simulator. Analysis of variance revealed no level effects between the performance of experimental and control groups within the simulator on the post-test on any of the three sections. The evidence in this study strongly supports the first theoretical hypothesis.

The second theoretical hypothesis that skills developed in the simulator would transfer into use during student teaching received very little support from the evidence collected. There are several possible reasons why no support was found. One, the post-test instrument may be invalid. While the instrument measured only behaviors and principles specifically included in the simulator materials, operational definitions may not have been adequate. However, coefficients of observer agreement after training ranged from .67 to .96 with the exception of a .36 for "Principles Applied Incorrectly" which indicated that the instrument was objective. The lower coefficients would allow error.

The second reason offered in explanation for non-support of H_2 is that interaction between other uncontrolled variables within the classroom and the behaviors and principles being observed may exist.

Another reason may be that perhaps the wrong principles were being developed. Evidence provides some support for this postulate. The data recorded by the trained observers indicates that the experimental group applied 28 principles resulting in inadequate class results while the control group applied 9 principles with inadequate results to the behavior of Inattention. Both groups applied approximately the same number of principles with adequate and acceptable results, 91 and 92. This would support the hypothesis that the experimental group was transferring or applying more principles during their student teaching assignment than the control group. However, these transferred principles did not elicit desirable classroom behaviors. The same results were obtained but to a lesser degree with disorderly conduct. In addition, all three observer groups, trained observers, university coordinators, and supervising teachers provide further support of this hypothesis by their recording of more principles generally applied but not applied to any of the five specific behaviors by the experimental group than by the control group despite fewer observations.

Another explanation is that perhaps more time should be allocated to simulator experience to enable the completion of more problems. Six problems giving experience with inattentive behavior were provided to the experimental group. This behavior was the only one found by the trained observers where principles were applied significantly different by the experimental and control groups even though they were applied with negative results. Problems pertaining to the behaviors disorderly conduct and distracting behavior were presented to the teacher trainees with the next highest frequency with three problems each being presented. These three behaviors--inattention, disorderly conduct, and distracting behavior--which were experienced most frequently by the teacher-trainees in the classroom simulator provided the highest statistical value in each category as recorded by the trained observers. The evidence indicates a trend toward a relationship between number of problems presented and post-test success.

Still another reason why skills developed in the simulator did not transfer into use during the student teaching assignment is the differentiation between the grade level of the simulated classroom (6th grade) and the grade level in which the student teacher is teaching. The subjects in the experiment were assigned to grades K through 8. Classroom problems and techniques of coping with them are different across this large grade distribution.

The results obtained from the data recorded by the university coordinators and the classroom supervisors is reported but was not used in arriving at decisions about each hypothesis for two reasons. One, it was impossible to collect a coefficient of observer agreement with these two groups of observers. The only indication of what their agreement might be was obtained by the trained observers before training. These coefficients were extremely poor. The second reason, two university coordinators (2 out of 14) did not return the Observational Record Forms. These two coordinators represented 20 observations.

The evidence recorded on the confidence scale provides strong support for the third theoretical hypothesis that classroom simulator experience will increase one's self-confidence in ability to teach. The "F" value found was significant, $p < .01$ level of confidence.

Information gathered by the "Student Reaction to Simulator Experience" questionnaire both after the simulator experience and during the student teaching assignment indicates that the participants did feel that the experience was worthwhile and helpfül. Because the teacher-trainees indicated that the simulator was realistic--not particularly realistic and that they felt involved--not particularly involved, perhaps the simulator experience could be provided to small groups (4 to 6 subjects) instead of on an individual basis. The value of the discussion elicited by the simulator may replace the advantages of the individual mode.

Summary of the Results

Three hypotheses were tested in this study. Their alternative hypotheses pertained to: H_1, the effectiveness of the classroom simulator as a teaching tool; H_2, the transfer value of the simulator; and H_3, the effectiveness of the simulator in increasing teacher-trainee's confidence level in their ability to teach.

The results of the findings pertaining to each of the three hypotheses are summarized in Tables 42, 43, and 44.

TABLE 42.--Summary of null hypothesis$_1$ findings: Effectiveness of classroom simulator experience.

Hypothesis	Division	Criterion Instrument	Analysis Technique	Value Found	Value Needed for Significance	Decision
H_{0_1}: No differences will exist between groups provided with and	Awareness of Problems	Post-test	Analysis of Variance	F= 2.58	F 4.02 @ .05 level of confidence	Accept
without simulator experience in their ability to identify and react to problems	Response to Problems	Post-test	Analysis of Variance	F= 8.33	F 7.12 @ .01 level of confidence	Reject $p<.01$
Symbolically: $H_{0_1}: M_1 = M_2$ $H_1 : M_1 > M_2$	Application of Principles	Post-test	Analysis of Variance	F=24.5	F 7.12 @ .01 level of confidence	Reject $p<.01$

TABLE 43.--Summary of null hypothesis$_2$ findings: Transfer effects of classroom simulator experience.

Division		Trained Observers		University Coordinators		Classroom Supervisors	
		Value	Decision	Value	Decision	Value	Decision
Awareness of Problems	Inattention	z = .68	NSD	z = 2.44(-)	Sign.	z = 3.43(-)	Sign.
	B & T	z = .53	NSD	z = .07	NSD	z = 3.76	Sign.
	Disord. C.	z = 1.22	NSD	z = 1.11	NSD	z = .71	NSD
	Distr. Beh.	z = 1.22(-)	NSD	z = .65	NSD	z = .23	NSD
	Fatigue	z = .26	NSD	z = 1.48(-)	NSD	z = .62	NSD
	TOTAL	z = .10*	NSD	z = 1.93(-)*	NSD	z = 2.47(-)*	Sign.
Effectiveness of Response to Problems	Inattention	x^2 = 2.60	NSD	x^2 = 1.89	NSD	x^2 = 5.04	Sign.
	B & T	x^2 = .32	NSD	p = .36	NSD	x^2 = 7.35	Sign.
	Disord. C.	x^2 = .68	NSD	p = .65	NSD	x^2 = .36	NSD
	Distr. Beh.	x^2 = 4.94	NSD	x^2 =16.45	Sign.	x^2 = 11.33	Sign.
	Fatigue	p = .55****	NSD	p = .45	NSD	x^2 = 4.46	NSD
	TOTAL	x^2 = .77**	NSD	x^2 =11.87**	Sign.	x^2 = 19.62**	Sign.
Application of Principles	Inattention	x^2 = 7.30	Sign.	x^2 = .91	NSD	x^2 = 6.00	Sign.
	B & T	x^2 = .10	NSD	p = .84	NSD	x^2 = 8.30	Sign.
	Disord. C.	x^2 = 1.30	NSD	p = .63	NSD	x^2 = .61	NSD
	Distr. Beh.	x^2 = .70	NSD	x^2 = 5.69	Sign.	x^2 = 4.00	Sign.
	Fatigue	x^2 = .35	NSD	p = .47	NSD	p = 1.00	NSD
	TOTAL	x^2 = 4.02***	Sign.	x^2 = .0001	NSD	x^2 = 21.00***	Sign.

Note: B & T = Baiting and Testing; Disord. C. = Disorderly Conduct; Distr. Beh. = Distracting Behavior; Sign. = Significant.

*z is significant if > 1.96 @ .05 or > 2.58 @ .01 levels of confidence.
**x^2 is significant if $\geq$ 4.60 @ .05 or $\geq$ 7.82 @ .01 levels of confidence-one tail, 2 d.f.
***x^2 is significant if $\geq$ 2.71 @ .05 or $\geq$ 5.41 @ .01 levels of confidence-one tail, 1 d.f.
****Fisher Exact Probability Test, p significant if $\leq$ .05.

TABLE 44.--Summary of null hypothesis$_3$ findings: effectiveness of classroom simulator experience on confidence level toward teaching.

	Hypothesis	Division	Criterion Instrument	Analysis Technique	Value Found	Value Needed for Significance	Decision
H_{o_3}:	No differences will exist between groups provided with and without classroom simulator experience in their confidence level toward teaching. Symbolically: H_{o_3}: $M_1 = M_2$ H_3 : $M_1 > M_2$	Pre-test Difference Scores	Confidence Scale	Analysis of Variance	$F = 7.93$	p 7.12 @ .01 level of confidence	Reject $p < .01$

Based upon the findings summarized in Table 42 the first hypothesis was rejected and its alternative accepted that teacher-trainees provided with simulated classroom problems are better able to identify and cope with simulated representative classroom problems than are teacher-trainees not provided with such experience.

The second null hypothesis was not rejected. The evidence summarized in Table 43 does not indicate that the skills developed within the simulator transfer and are employed during the teacher-trainee's student teaching assignment.

The third null hypothesis tested is rejected by the evidence as summarized in Table 44. The alternative hypothesis that simulator experience increases self-confidence in teaching ability is therefore supported.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

This study investigated: (1) the effect of a classroom simulator in providing teacher-trainees with experience in identifying and coping with classroom problems prior to their student teaching experience; (2) the transfer value of the classroom simulator experience; and (3) the effect of the simulator on teacher-trainee self-confidence in their ability to teach. In addition, the study measured teacher-trainee attitudes toward their classroom simulator experience.

A two factorial design was employed consisting of an experimental and a control group which were selected randomly from a Junior level Elementary Bloc sequence at Michigan State University divided by high and low GPA's. The experimental group received nine hours of classroom simulator experience while the control group received an orientation session only. Uncontrolled variables were assumed to be distributed randomly.

Three hypotheses were formulated:

H_1: Subjects receiving classroom simulator experience will identify and react more correctly to representative simulated classroom problems as measured by a post-test, than subjects not receiving classroom simulator experience.

H_2: Subjects receiving classroom simulator experience will identify and react more effectively to actual classroom problems, as measured by an observation criterion instrument during their student teaching assignment, than subjects not receiving classroom simulator experience.

H_3: Subjects receiving classroom simulator experience will exhibit a higher level of confidence in their ability to teach, as measured by a confidence scale, than a group not receiving simulator experience.

A replica of a front section of a sixth grade classroom was constructed. Classroom problems and feedback sequences were projected in sound, motion, and color on a large rear projection screen in "life-like" size. Teacher-trainees physically and verbally responded to each problem presented and immediately observed the class behavior elicited by their response. Problems and feedback sequences were presented repeatedly until the teacher-trainee elicited a desirable response from the class. A guided discovery technique was employed.

Following the instructional phase, both groups were given a post-test in the simulator. The first hypothesis was supported. Significant differences were found between the groups on the mean test scores for two out of three divisions of the test. The experimental group was significantly better in coping and being aware of more principles used in handling the simulated classroom problems. No differences were found between the mean scores of the two groups for being aware that problems did exist.

A follow-up study measured the transfer effect of the simulator experience during the teacher-trainee's student teaching experience. The second hypothesis did not find adequate support. Three groups observed the teacher-trainees during student teaching: (1) three trained observers, (2) university coordinating professors, and (3) classroom supervising teachers. The transfer instrument (Observation Record Form) was divided into the following sections: awareness of problems, response to problems, and application of principles. No significant differences were found by the trained observers between the experimental and control groups on their awareness of problems existing or on their effectiveness in responding to the problems. Significant differences were found in the application of principles used in solving classroom problems. Analysis of the data indicated that both groups applied approximately equal numbers of principles with effective results but the experimental group applied a greater number of principles with ineffective results.

Problems of low coefficient of observer agreement and insufficient return of observation data limited the significance of the findings recorded by the university coordinators and classroom supervisors. The university coordinators recorded significant differences between the two groups on responding effectively to problems but no differences on awareness of problems and correct application of principles. The classroom supervisors found significant differences on the observational instrument for all three divisions--awareness of problems, response to problems, and application of principles.

The evidence recorded on the confidence scale provided strong support for the third hypothesis that classroom simulator experience increases self-confidence in ability to teach.

Information collected by the attitude scale, "Student Reaction to Simulator Experience," indicated that the participants did feel that classroom simulator experience was worthwhile and helpful.

Conclusions

Several conclusions are made from the findings reported in this experiment.

1. Awareness of classroom problems is not developed through classroom simulator experience. Teacher-trainees apparently possess this ability to identify classroom problems prior to the simulator experience.
2. Effective responses to classroom problems can be developed through classroom simulator experience prior to the teacher-trainee's student teaching assignment.

3. Principles which can be used in solving classroom problems can be developed through classroom simulator experience prior to the teacher-trainee's student teaching assignment.
4. Experiences gained in responding to problems within the classroom simulator do not transfer to the teacher-trainee's student teaching experience. However, evidence does exist which supports the postulate that experience with more classroom problems increases transfer.
5. Principles developed for application in solving classroom problems do transfer to the teacher-trainee's student teaching experience.
6. Teacher-trainee confidence in ability to teach is increased through classroom simulator experience.

Implications for Future Research

Several problems were encountered during this experiment which need further study. Since replications of findings should be a requirement before innovations are employed on a general basis, this experiment should be repeated to determine if the findings are replicated.

A question that developed during the experiment was whether the individual attention and discussion between the research assistant and teacher-trainee might have the same effect without the simulator materials. This question could be answered by employing a second treatment group where the teacher-trainee and a research assistant would discuss the same problems and principles but without simulator materials.

Results of the transfer test as recorded by the trained observers provide some evidence that a relationship might exist between number of problems experienced per behavior within the simulator and amount of transfer during student teaching. Another experiment manipulating this variable could provide an answer to the question.

The value of the guided discovery technique employed in this experiment should be further researched. Another experiment employing identical materials but using a pure discovery technique, guided discovery technique, and expository techniques should be undertaken. A pure discovery technique would require considerably more time for completing a like number of problems. The transfer effects of these treatments might prove very interesting.

More research is needed to determine the effectiveness of screen size and motion. The Kersh study indicated that a smaller, less realistic size was most effective. Kersh also found that more practice trials were required with motion pictures than with slides which might give support to a hypothesis that slides are more effective than motion pictures. However, Kersh made no attempt to determine the transfer effects of such treatment. Further experimentation with size and motion and their effects on transfer are necessary.

More research is necessary in identifying classroom problems encountered by student teachers. Principles employed on solving classroom problems should be identified and validated through their everyday effective use by experienced classroom teachers. These problems and validated principles should be classified by grade levels. New simulator materials should be developed based upon these validated lists.

If further classroom simulator research provides evidence that simulation is effective in teacher education, simulation materials should be developed by grade levels. One problem encountered in this experiment was teacher-trainees did not feel that the simulator problems (6th grade) they were experiencing were pertinent at the grade level they desired to teach. Materials should be by grade classifications such as K, 1-3, 4-6, 7-9 by subjects, 10-12 by subjects, and in special education areas.

In order to determine whether or not it is necessary to simulate specific classes (all problems and sequences filmed in one classroom) so as to enable teacher-trainees to become familiar with all class members, further research is needed. The alternative would be to record, randomly, classroom incidents and responses over a period of years and then employ these episodes in teacher education through simulation projection techniques.

These have been a few of the problems which this experiment has exposed. In Chapter II, the review of literature revealed that research evidence supporting simulation in the educational field is very limited. Educators are beginning to realize the possibilities which simulation techniques may provide for improving and fulfilling educational objectives. This experiment has been one of many needed before this innovation is employed in teacher education courses in colleges and universities on a wide basis.

BIBLIOGRAPHY

BIBLIOGRAPHY

Adams, Jack A. "Some Considerations in the Design and Use of Dynamic Flight Simulators." Simulation in Social Science: Readings. Harold Guetzkow, editor. New Jersey: Englewood Cliffs, 1962, pp. 29-47.

Ammons, R. B. "Effects of Knowledge of Performance: A Survey and Tentative Theoretical Formulation," Journal of General Psychology, 54:279-299 (1956).

Anderson, G. L. "Quantitative Thinking As Developed Under Connectionist and Field Theories of Learning," Learning Theory in School Situation. Minneapolis: University of Minnesota Press, 1949, pp. 40-73.

Angel, G. W., and Troyer, M. E. "A New Self-Scoring Test Device for Improving Instruction," School and Society, 67:84-85 (January 31, 1948).

Ausubel, D. P. The Psychology of Meaningful Verbal Learning. New York: Grune and Stratton, 1963.

Bloom, Benjamin S. "The Study of the Thought-Processes of Students in Classroom Situations," University of Chicago Round Table No. 766, November, 1952, pp. 17-19.

Brookover, Wilbur, and Gottlieb, David. A Sociology of Education. Second Edition. New York: American Book Company, 1964.

Bushnell, Don D. System Simulation: A New Technology for Education. Santa Monica, California: System Development Corporation, April, 1962.

Callantine, M. F., and Warren, J. M. "Learning Sets in Human Concept Formation," Psychological Report, 1:363-367 (1955).

Cherryholmes, Cleo. "Developments in Simulation of International Relations in High School Teaching," Phi Delta Kappan, 44:227-231 (1965).

Cofer, C. N. "Experimental Studies of the Role of Verbal Processes in Concept Formation and Problem-Solving," Fundamentals of Psychology: The Psychology of Thinking. E. Harms, editor. New York Academy of Science, 91:94-104 (1960).

Cohen, Kalman, and Cyert, Richard M. "Simulation of Organizational Behavior," Simulation Models for Education. Nicholas Fattu and Stanley Elam, editors. Beloomington, Indiana: Phi Delta Kappa, 1965, pp. 105-158.

Corman, B. R. "The Effect of Varying Amounts and Kinds of Information as Guidance in Problem Solving," Psychology Monograph, 71:1-21 (1957).

Craig, R. C. "Directed Versus Independent Discovery of Established Relations," Journal of Educational Psychology, 47:223-234 (1956).

Duncan, C. P. "Recent Research on Human Problem Solving," Psychological Bulletin, 56:397-429 (1959).

Frederiksen, Norman. "In-Basket Tests and Factors in Admininstrative Performance," Simulation in Social Science: Readings. Harold Guetzkow, editor. New York: Prentice-Hall, Inc., 1962, pp. 124-137.

Gagne, Robert M. The Conditions of Learning. New York: Holt, Rinehardt and Winston, Inc., 1965.

Gagne, Robert M., and Bolles, Robert C. "A Review of Factors In Learning Efficiency," Automatic Teaching: The State of the Art. E. H. Galenter, editor. New York: John Wiley and Sons, 1959, pp. 13-46.

Gagne, Robert M., and Smith, E. C., Jr. "A Study of the Effects of Verbalization on Problem Solving," Journal of Experimental Psychology, 63:12-18 (1962).

Gibbons, John W. "Simulators: Research Tools," Safety Education, 41:14-15 (November, 1961).

Greenlaw, Paul S. "The In-Basket as a Training Instrument," Marketing Keys to Profits in the 1960's. Wenzil K. Dolva, editor. Chicago: American Marketing Association, 1960, pp. 452-459.

Greenlaw, Paul S., Herron, Lowell W., and Rawdon, Richard H. Business Simulation In Industry and University Education. New York: Prentice-Hall, Inc., 1962.

Guetzkow, Harold. "A Use of Simulation in the Study of Inter-Nation Relations," Simulation in Social Science: Readings. Harold Guetzkow, editor. New York: Prentice-Hall, Inc., 1962, pp. 82-93.

Haggard, Ernest A. Intraclass Correlation and the Analysis of Variance. New York: The Dryden Press, Inc., 1958.

Hays, William L. Statistics for Psychologists. New York: Holt, Rinehart, and Winston, 1963.

Hendrix, C. "A New Clue to Transfer of Training," Elementary School Journal, 48:197-208 (1947).

Hovland, C. I. "Human Learning and Retention," Handbook of Experiment Research. S. S. Stevens, editor. New York: Wiley, 1951, pp. 613-689.

Hughes, Marie, et al. A Research Report: Assessment of the Quality of Teaching in Elementary Schools. Salt Lake City: University of Utah Press, 1959.

Immegart, Glenn L. The Instructional Uses of Simulation in the Preparation of School Administrators. Columbus, Ohio: University Council for Educational Administration, January, 1962, pp. 1-14.

Judd, C. H. Psychology of Secondary Education. Boston: Ginn and Company, 1927.

Katona, G. Organizing and Memorizing. New York: Columbia University Press, 1940.

Kersh, Bert Y. Classroom Simulation: A New Dimension in Teacher Education. Final Report, Title VII, Project Number 886, National Defense Education Act of 1958. Monmouth, Oregon: Teaching Research, Oregon State System of Higher Education, June 30, 1963.

Kersh, Bert Y. "Instructions for Using Classroom Simulation Materials," Mimeographed materials received through correspondence, Monmouth, Oregon: Teaching Research Division, January, 1965.

Kersh, Bert Y. "The Adequacy of 'Meaning' as an Explanation for the Superiority of Learning by Independent Discovery," Journal of Educational Psychology, 49:282-292 (1958).

Kittell, J. E. "An Experimental Study of the Effect of External Direction During Learning in Transfer and Retention of Principles," Journal of Educational Psychology, 48:391-405 (1957).

Lloyd, K. E. "Supplementary Report: Retention and Transfer of Responses to Stimulus Classes," Journal of Experimental Psychology, 59:206-207 (1960).

McKeachie, W. J. "Research on Teaching at the College and University Level," Handbook of Research on Teaching. N. L. Gage, editor. Chicago: Rand McNally and Company, 1963, pp. 1118-1172.

Mead, G. H. Mind, Self, and Society. Chicago: University of Chicago Press, 1934.

Medley, Donald M., and Mitzel, Harold E. "Measuring Classroom Behavior by Systematic Observation," Handbook of Research on Teaching. N. L. Gage, editor. Chicago: Rand McNally and Company, 1963, pp. 271-274.

Miller, R. B. Psychological Considerations for the Design of Training Equipment. Ohio: Wright Air Development Center, Wright-Patterson Air Force Base, December, 1954.

Murphy, Gardner. "Affect and Perceptual Learning," Psychological Review, 63:1-15 (January, 1956).

Norcross, Katherine, and Spiker, C. C. "Effects of Mediated Associations on Transfer in Paired-Associate Learning," Journal of Experimental Psychology, 55:129-134 (1958).

Osgood, C. E. Method and Theory in Experimental Psychology. New York: Oxford University Press, 1953.

Porter, Douglas. "Teaching Machines," Teaching Machines and Programmed Learning. A. A. Lumsdaine and R. Glaser, editors. Washington: National Educational Association, 1960, pp. 206-214.

Remmer, H. H., et al. "Second Report of the Committee on Criteria of Teacher Effectiveness," Journal of Educational Research, 46:641-658 (1953).

Renshaw, Jean, and Heuston, Annette. The Game Monopologs. RM-1917-1. Santa Monica, California: The Rand Corporation, July, 1960.

Smith, K. R., and Van Ormer, E. B. Learning Theories and Instructional Film Research. Port Washington, New York: Special Devices Center, Office of Naval Research, June, 1949.

Sommer, Robert. "The Effects of Rewards and Punishments During Perceptual Organization," Journal of Personality, 25:550-558 (September, 1957).

Sorenson, Herbert. Psychology in Education. New York: McGraw-Hill Book Company, 1940.

Stacey, C. L. "The Law of Effect in Retained Situations with Meaningful Material," Learning Theory in School Situations. Minneapolis: University of Minnesota Press, 1949, pp. 74-103.

______, "Status Report on Research Project," mimeographed sheet received through personal correspondence with Richard Wing, Chief Investigator, Project 2841, Northern Westchester Board of Cooperative Educational Services, 845 Fox Meadow Road, Yorktown Heights, New York.

Stock, D. "Investigations into Inter-Relations Between Self-Concept and Feelings Directed Toward Other Persons and Groups," Journal of Consulting Psychology, 13:176-180 (June, 1949).

Symonds, Percival M. What Education Has To Learn From Psychology. New York: Columbia University, Teachers College, 1964.

Thorndike, E. L. Educational Psychology, Vol. II, The Psychology of Learning. New York: Teachers College, Columbia University, 1923.

Wallen, Norman E., and Traverse, Robert M. W. "Analysis and Investigation of Teaching Methods," Handbook of Research on Teaching. N. L. Gage, editor. Chicago: Rand McNally and Company, 1963, pp. 448-505.

Wittrock, M. C. The Learning By Discovery Hypothesis. A paper prepared for The Conference on Learning by Discovery, New York City, January 28-29, 1965. California: Stanford University, 1965.

Wolfe, Duel. "Training," Handbook of Experimental Psychology. S. S. Stevens, editor. New York: John Wiley and Sons, Inc., 1951, pp. 1267-1286.

Woodworth, R. S., and Schlosberg H. Experimental Psychology. Revised edition. New York: Henry Holt and Company, 1954.

Young, Kimbal. Social Psychology. Third edition. New York: Appleton-Century Crofts, 1956.

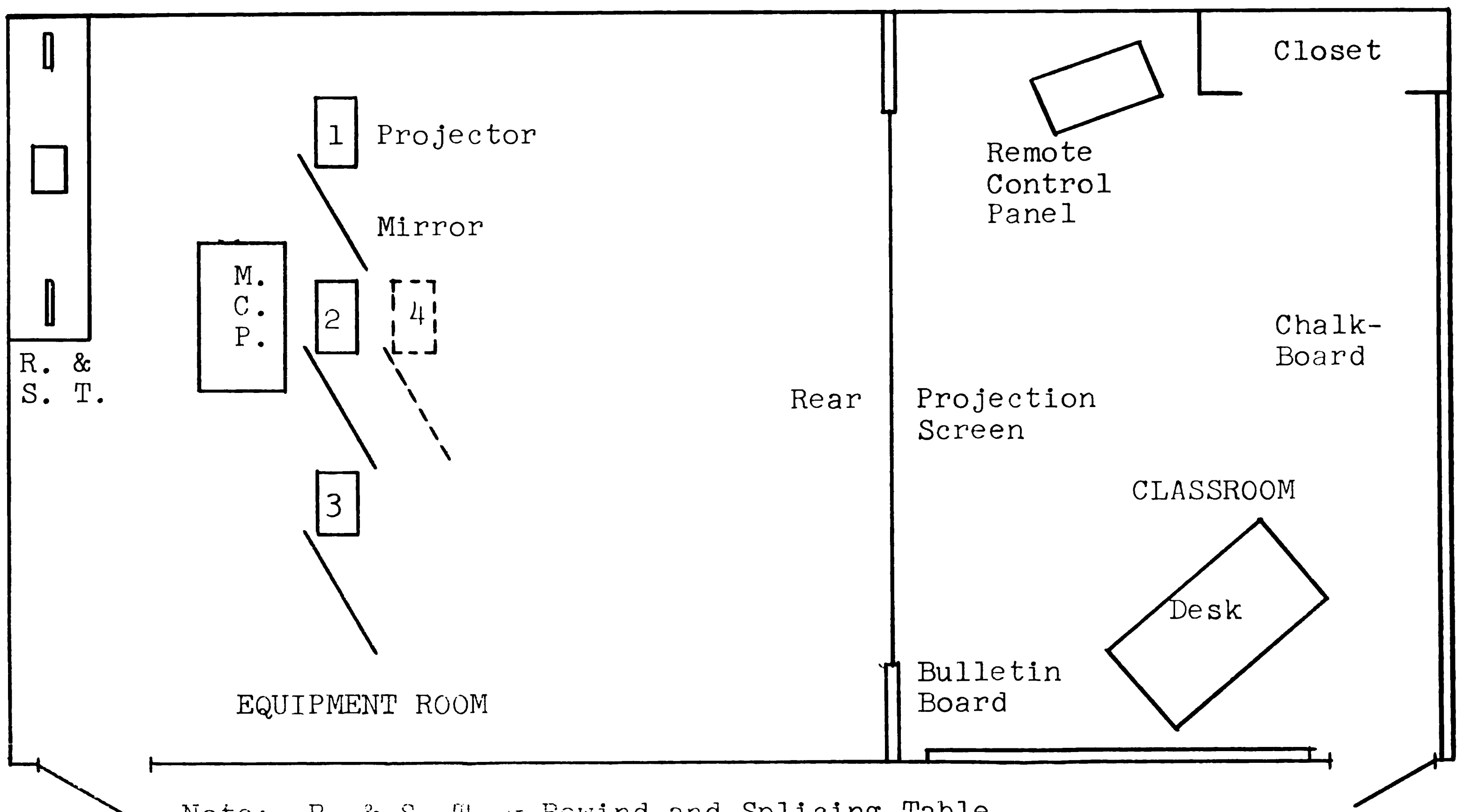
Zaun, Cecil G., and Schroeder, Melvin T. "The Drive Trainer: A Teaching Machine," Journal of Secondary Education, 37:112-116 (February, 1962).

APPENDICES

APPENDIX A

APPENDIX A

PHYSICAL ARRANGEMENT OF CLASSROOM SIMULATOR



Note: R. & S. T. = Rewind and Splicing Table
M. C. P. = Master Control Panel

APPENDIX B

APPENDIX B

EXAMPLES OF CLASSROOM SIMULATOR INSTRUCTIONAL PROCEDURAL SHEETS

Orientation Sequence
Mr. Land's Sixth Grade

PURPOSE

To provide T with an experience comparable to an observation prior to student teaching. Also to help T get used to speaking to the class and to learn to identify the pupils by name.

PROBLEM

Mr. Land asks T to introduce himself to the class.

SITUATION

It is about midmorning and Mr. Land is passing out papers to individuals in the class, calling them by name. T has just entered and is waiting to be noticed by Mr. Land. It should be understood that Mr. Land has interviewed T previously in private and is expecting T to visit the class at this time to be introduced. This takes place about one week prior to the time when T actually is to begin student teaching.

SCRIPT

1.	OPEN ON MR. LAND PASSING OUT PAPERS TO CLASS.	MR. LAND:	(says each pupil's name as he passes out papers.)
	LOOKS TO FRONT AS IF NOTICING T FOR FIRST TIME.		"Oh, hello. Would you have a seat over there? I'll be right with you."
	CONTINUES PASSING OUT PAPERS.		
	WALKS TO FRONT AND SPEAKS DIRECTLY TO T.		"Now, if you would like to think of a few things to say to the class.

		I'll give you a few minutes to think about it; then I'll call on you.
	CONTINUES PASSING PAPERS.	"All right . . . now class, I'd like you to meet our new student teacher and . . .
	NODS TOWARD T.	I believe I'll let you introduce yourself."
	LONG SLOW PAN OF CLASS LISTENING TO T.	
2.	OPEN ON CLASS LISTENING. MR. LAND STEPS IN VIEW AND SPEAKS TO T. THEN CONTINUES PASSING OUT PAPERS.	(Thanks T and continues passing out papers and commenting to class.)

PROGRAMS

Program I--1
Instructional Procedure
Mr. Land's Sixth Grade

Situation: This is the first part of the day, just a few minutes before the tardy bell rings. Mr. Land has been called to the office to straighten out a matter concerning lunch tickets and has asked you to monitor the class. You are standing in front of the room. About half the youngsters are in the room. The rest are coming in from the playground.

Problem Scene: Scene opens on class about half empty. Jack approaches T and says that he has been sick the previous week and should not be allowed to play during recess.

Hold Cue: ". . . to play today."

Response Method

Standards

I In problems involving rules of procedure, defer to authority vs. establish own rules.
II Show supporting manner vs. show nonsupporting manner.

A. Defers to authority: supporting manner (3)

Assures Jack that his request will be considered. Is brief, but warm and supporting. Avoids prolonged conversation.
"Thank you, Jack. We will check this with Mr. Land."
"Would you mind checking this with Mr. Land?" [1]
"Thank you, Jack. I am sure Mr. Land will take care of it."

B. Defers to authority: nonsupporting manner (2)

Refers Jack to Mr. Land, but in a curt or rejecting manner.
"Go see Mr. Land, will you?" [1]
"I can't help you, Jack. That's Mr. Land's department."

C. Establishes own rules: supporting manner (2)

Same as A, but:

Alternatives

(1) Asks for note.
"Thank you, Jack. Do you have a note?" [3]

(2) Anticipates Mr. Land's decision
"I'm sorry to hear that, Jack. We will arrange something else for you to do during recess period." [1]

D. Establishes own rules: nonsupporting manner (1)

Is extremely abrupt or rejecting

Alternatives

(1) Asks for a note immediately [3]
"Well, Jack, do you have a note?"

(2) Orders Jack to seat without reassuring him. [1]
"Go to your seat, Jack. The bell is about to ring."

(3) Dismisses the problem abruptly.
"Don't bother me with this now." [1]

E. No response (0)

Feedback Descriptions

Feedback 1: Jack nods and returns to his seat.

Feedback 3: Jack reaches in his pocket and draws out a note.

Problem Assessment

Stimulus Situation

(1) Jack communicates to T that he has been sick the previous week.

(2) He asks permission not to play during recess.

Supplementary Information

Jack is a low-ability student who often receives criticism as a personal attack.

Program I--2
Instructional Procedure
Mr. Land's Sixth Grade

Situation: Now it is about 9:30 in the morning. Imagine that Mr. Land has been called out of the room unexpectedly and has asked you to take over for ten or fifteen minutes. Since you have no particular instructional duties yet, you have decided to describe something of educational value from your own experience. Think of some recent experience you have had--something that you did on your vacation, for instance, or something about your experiences in school--and start telling the class about it. You are speaking from the front of the room and the class is listening to you.

Problem Scene: Class appears to be listening attentively to something T is saying or doing. Karen looks puzzled and says, "But I don't understand." Class appears to disagree with Karen.

Hold Cue No. 1: After image blinks; "But I don't understand," plus class reaction.

Release Hold: If T asks, "What don't you understand?" film continues with Karen answering, "The words that you use are so big."

Hold Cue No. 2: After class reaction to Karen. (2nd time)

Response Method

Standards

I When learners appear disinterested or confused, it is T's responsibility to stimulate a more active, interested response vs. to make no effort to change the learner's response.

II Be attentive to entire class as well as the individual vs. be attentive either to the individual or to the class only.

A. Stimulates active response: attends to entire class as well as individual (3)

Alternatives

(1) Gives other students a chance to participate [3]
"Well class, can you help Karen out?"

(2) Gives a brief explanation to Karen using a different approach or simpler language. [1]
"Karen, what I meant to say was . . ."
(Gives brief explanation)

B. Stimulates active response: attends either to the individual or to the class only (2)

Questions Karen beyond initial inquiry — Verbal
"Karen, what words don't you understand?"

C. Does not stimulate active response: attends to entire class as well as individual (2)

Explains it will be clear later on [1]
"Just a few minutes, Karen. It will become clear."

D. Does not stimulate active response: attends to either the individual or to the class only (1)

Alternatives

(1) Makes elaborate explanation [1]

(2) Scolds class for their reaction [1]
"Class, settle down. . ."

(3) Scolds Karen for not understanding [1]
"Karen, you shouldn't interrupt me."

E. No response (0)

Feedback Descriptions

Feedback 1: Karen nods in satisfaction and class reacts with relief.

Feedback Descriptions (cont.)

Feedback 2: (After hold cue No. 1) Karen explains that T's "words are too big."

Feedback 3: Karen smiles, others raise their hands as if to speak.

Examples of Verbal Feedback

For B: Karen answers T's questions appropriately. Others in class appear impatient.

Problem Assessment

Stimulus Situation

(1) Karen interrupts T to say she doesn't understand.
(2) Others in class appear to disagree with Karen.

Supplementary Information

Karen is an over-achiever who strives to please everyone. She insists on pursuing a topic until she understands it completely. Karen's question should not be considered lightly by T.

Program I--3
Instructional Procedure
Mr. Land's Sixth Grade

Situation: This is a continuation of the previous situation. Continue talking to the class as if you has picked up where you left off before Karen interrupted. You are in the front of the room and the class is listening. Mr. Land has not returned yet.

Problem Scene: Jackie asks for clarification of what T is saying. This time the entire class seems to need the clarification.

Hold Cue: After image blinks or "This time I don't understand" plus class reaction.

Release Hold: If T asks, "What don't you understand?" film continues with Jackie saying, "I just don't get it."

Hold Cue: ". . . just don't get it."

Response Method

Standards

I When the learners appear disinterested or confused, it is T's responsibility to stimulate a more active, interested response vs. to make no effort to change the learners' response.

II Show supporting manner vs. show nonsupporting manner.

A. Stimulates active response: supporting manner (3)

Alternatives

(1) Uses different modes of teaching, e. g., uses chalk board. [1]

(2) Shifts to getting information from the class "Well, does anyone have a suggestion?" [Verbal]

(3) Changes topic "This is not too important anyway. Would you like me to tell you about the ---?" Describes other topic. [Verbal]

B. Stimulates active response: nonsupporting manner (2)

Same as A, but acts irritated or disgusted with class [3]
"Why don't you understand? It's very simple . . ."

C. Does not stimulate active response: supporting manner (2)

Alternatives

(1) Persists with same mode of teaching.
"Well Jackie, I'll say it again."

(2) Acknowledges failure to interest group without changing presentation. [3]
"Well, I guess I didn't do too well this time. Lets go on anyway."

D. Does not stimulate active response: nonsupporting manner (1)

Scolds class for not paying attention without attempting to clarify or shift instructional method.
"Maybe you weren't paying attention. I'll say it again."

E. No response (0)

Feedback Descriptions

Feedback 1: Class nods, smiles, as if in understanding.
Feedback 3: Class continues to look puzzled, frowning, commenting to neighbors.

Examples of Verbal Feedback

For A: Class raises their hands, perhaps with enthusiasm.

Problem Assessment

Stimulus Situation

(1) Jackie asks for clarification of what T is saying.

(2) The entire class seems to need the clarification.

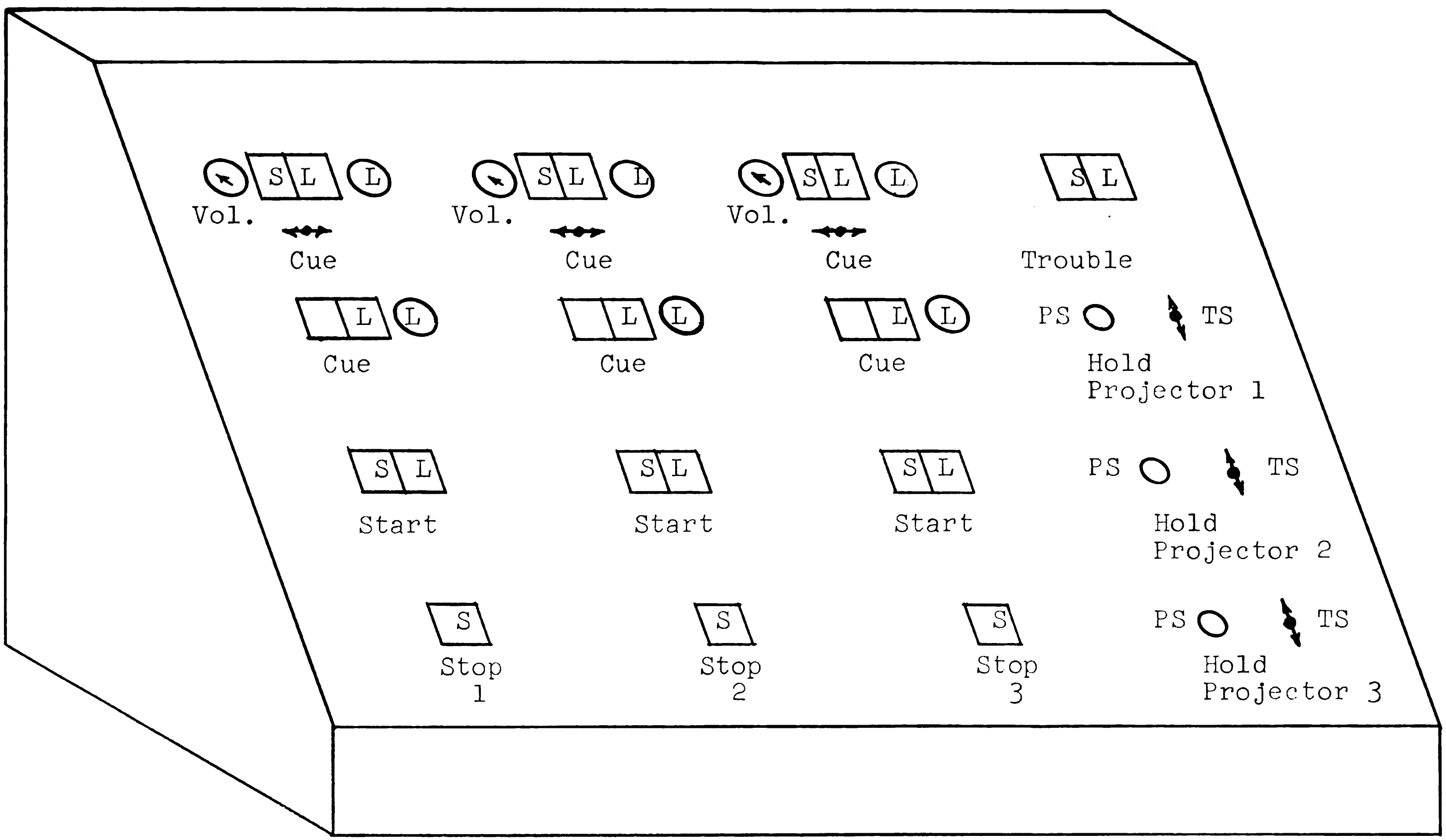
Supplementary Information

Jackie often speaks for most of the class when there is a matter of getting clarification. T's information is not particularly important, so the topic can be changed, or stopped entirely.

APPENDIX C

APPENDIX C

REMOTE CONTROL PANEL



Note: S = Switch, Push
L = Lamp

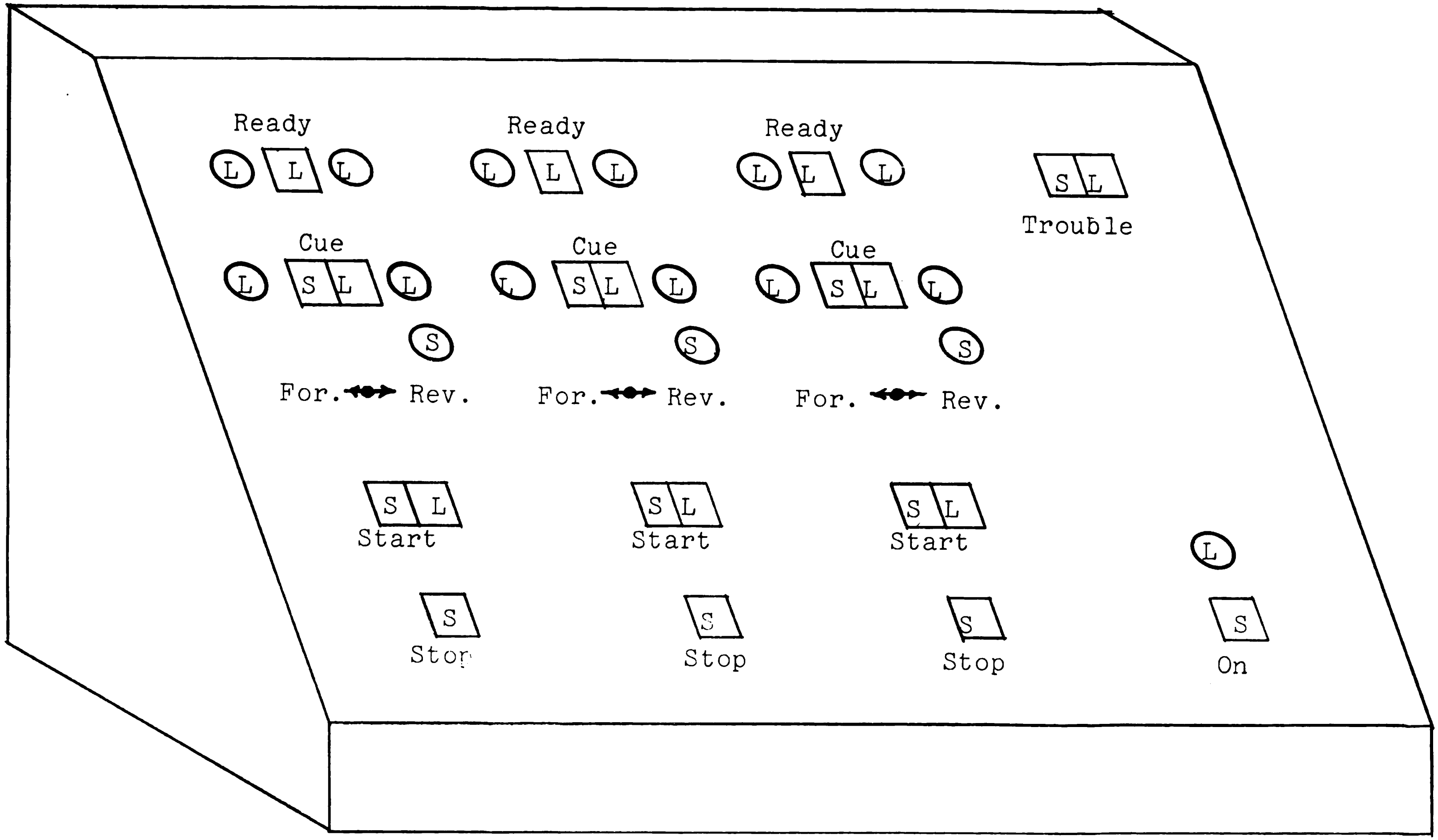
Vol. = Volume Control
PS = Push Switch

TS = Toggle Switch

APPENDIX D

APPENDIX D

MASTER CONTROL PANEL



Note: S = Switch, Push
L = Lamp

For. = Forward
Rev. = Reverse

APPENDIX E

APPENDIX E

POST-TEST SCORE INSTRUMENT

Subject ______________________________

Group ______ Hour ______ Date ______

Problem	Resp.	Assess.	Princ.	Total
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
Total				

APPENDIX F

APPENDIX F

CLASSROOM SIMULATOR
POST-TEST PROCEDURE DIRECTIONS

I Establish rapport.

II Control Group:

Standard Orientation procedures.

III Post-Test:

Now that you are acquainted with your new class and your supervising teacher, Mr. Land, you are going to be presented with various episodes or events that occur in Mr. Land's classroom. These episodes could and usually do occur in any classroom.

Now, what are you to do?

1. Get involved in and with your class. This, right here, where we are both sitting, is the front of your classroom. As you can see, there is the chalkboard and beside you is a bulletin board as they might be in a regular classroom. The remaining part of the classroom will appear on the screen.

2. As you observe your class, if you see a problem developing or occurring I want you to physically and verbally react to cope with the problem. If you feel that you must physically move to solve the problem, then by all means do it. If you feel that the solution would require you to verbally respond, do it. The important thing is that you cope with the problem. Don't tell me what you would do. Show me. In your student teaching assignment you will not solve problems by telling the class what you should do, you will need to do it. Therefore, don't tell me, show me.

   If you don't remember a student's name and feel that you should use his name in coping with the problem, give the student a new name. In other words, pick a name out of the air.

Instead of considering this as a test, let's consider it as a chance to apply what you have learned about teaching. Your performance here will not in any way affect your Elementary Bloc grade. You are helping us evaluate these simulation materials and this technique as a teaching device in providing additional classroom experience.

Do you have any questions?

Okay. Let's try a sample episode. Remember, if you see a problem developing or occurring, physically and/or verbally respond to cope with the situation. Don't tell me. Show me.

IV <u>Steps</u>:

A. <u>Read Situation (Sample Problem)</u>

1. Problem
2. Student response
3. Student assessment of the problem
   a. What did you see happen and what did you hear in the classroom that made you react or respond?
   b. What principles were you aware of that you should have or may have applied to cope with this situation?
4. Comment from comment sheet

B. <u>Reread Direction No. 2</u>

Remember, as you observe . . . .

C. <u>Problems</u>

1 ----------- > 20

V <u>Comments after Student Responds to Each Problem</u>:

Okay, fine.

Okay, fine. That was an interesting problem, wasn't it?

You are doing fine.

You could almost call this fun, couldn't you?

Sometimes the action moves quickly, doesn't it?

V Comments after Student Responds to Each Problem:

Sometimes unexpected things happen in the classroom, don't they?

Teachers have to cope with all kinds of problems, don't they?

APPENDIX G

APPENDIX G

CLASSROOM OBSERVATIONAL RECORD INSTRUMENT

Name ______________________________ City ______________________________

School ______________________________ Date ______________ Time ______________

Observer ______________________________ Grade ______________

Student Behaviors	Behavior Occurred in Class	Student Teacher Aware-Overtly	How Did Student Teacher Handle the Situation?			Principles Applied to Correct the Behavior	Principles Applied. But Not to Any Specific Behavior
			Adequately	Acceptable	Inadequately		
Inattention							
Baiting and Testing							
Disorderly Conduct							
Distracting Behavior							
Fatigue							

OBSERVATION RECORD
(continued)

STANDARDS:

1. Rules of procedure--defers to authority.

2. Shows supporting manner.

3. Class disinterested or confused--stimulates a more active, interesting response.

4. Attentive to class as well as individual.

5. Discourages undesirable behavior.

6. Disruptive group or individual--Acts quickly.

7. Disruptive group or individual--Communicates at close range.

8. Encourages student initiative to learn.

9. Behavior which deviates from objectives--Avoids disrupting instruction.

10. Encourages correction of inappropriate responses.

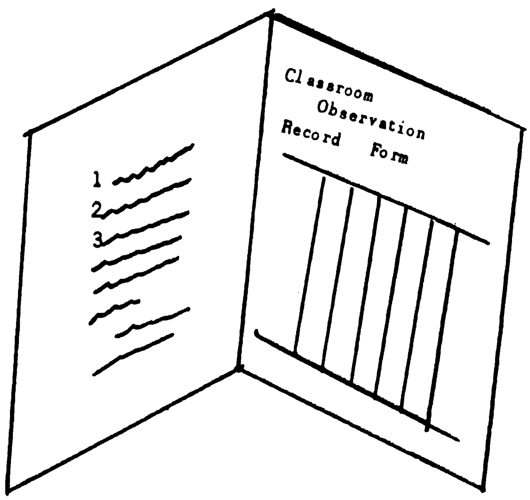
11. Conflicting parent-school interests--remains neutral.

HOW DID THE STUDENT TEACHER HANDLE THE SITUATION?

Adequately: Definite positive result

Acceptable: Results might be positive

Inadequately: Undesirable or no effect on behavior



APPENDIX H

APPENDIX H

DIRECTIONS FOR USING CLASSROOM OBSERVATIONAL RECORD FORM

Introduction:

This observational tool has been designed to serve a specific purpose; to determine if specific behaviors and standards experienced through a classroom simulator technique are applied by student teachers during their student teaching experience.

Behaviors and standards which are to be observed are operationalized by first describing each and then examples representative of the behaviors or standard are given. By studying these descriptions and examples each observer should form identical perceptions of each behavior and standard.

This observational tool will be used by trained observers who will observe all student teachers who have been involved in this project, during their student teaching experience, Spring quarter, 1965. In addition, each supervising teacher will use the same observation tool to make one half-hour observation each day for one week. All observations are to take place during the fourth week of the student teacher's assignment. Coordinating teachers will make one 30 minute observation between the third and fifth week.

Directions for Preparing to Use the Observation Record:

1. Quickly browse the Observation Record Form.

2. Study the operational definition of the student behaviors which are to be observed.

3. Study the operational definition of the standards which the student teacher is to be observed applying.

4. Study the operational definitions of the rating criteria to be used in answering the question, "How did the student teacher handle the situation?"

5. Practice using the Observation Record. Where difficulties are encountered, review the appropriate operational definitions. NOTE: An abbreviated form of the Standards and the Rating Criteria are attached opposite the Observation Record for your convenience. Use it.

Directions for Using the Observation Record:

1. Fill in the data requested at the top of the Observation Record.

2. Observe from a position where you can see the student teacher and the faces of the class members.

3. Place a tally mark (I) under the heading Behavior Occurred in Class column beside the appropriate Student Behavior whenever such student behavior is exhibited.

4. Place another tally mark (I) under the heading Student Teacher Aware if the student teacher gives an indication that she is aware of the exhibited student behavior.

5. Place a tally mark (I) in the appropriate column under the heading How Did the Student Teacher Handle the Situation, applying the proper rating criteria. After approximately 30 seconds, if the rating still is appropriate, circle the tally (Ⓘ); if not, scratch this tally and place a tally (I) in the appropriate space.

6. List the number or numbers (example: (I) or (1, 2, 5)) of the Standard or Standards which the student teacher applied in solving the student behavior problem under the heading Principles Applied to Correct the Behavior. NOTE: In some cases only one principle may be observed (1), and in others, multiple principles may be observed (1, 2, 5, 8). It is entirely possible that in some instances no principles will be used.

7. List the numbers of the Standards which the student teacher applies but are not applied to any specific student behavior listed.

8. Observe and tally in 5 minute intervals. Then begin over again using the same observation form. If a particular student exhibits a specific behavior intermittently during this 5 minute period, the student behavior would be tallied only once during that time interval. If the behavior is exhibited by the same student during the next time interval, it would again be tallied once.

Continue the observations in six consecutive 5 minute intervals for a total of 30 minutes each day for five days. Record each 30 minute period on separate forms.

In summary, the observer should locate herself so she can see the student teacher and the faces of the students, observe and tally horizontally from the left to the right on the Observation Record form, and use the abbreviated Standards and Rating Criteria sheet attached to the Observation Record as a guide.

Please return all completed Observation Records to your coordinator immediately upon completion. Do not discuss your observations with your student teacher until you have completed the fifth observation.

OPERATIONAL DEFINITIONS OF BEHAVIORS

1. Inattention:

Overt student behavior which is characterized by a student or students exhibiting a lack of interest or non-responsiveness to the student teacher.

Examples:
- a. Daydreaming
- b. Looking out the window
- c. Restlessness
- d. Doodling on paper

2. Baiting and Testing:

Behavior exhibited by a student or students for the purpose of determining how much deviant behavior the student teacher will tolerate.

Examples:
- a. Seeking permission to violate existing rules of procedure:
  1. Leave the room
  2. Early or longer recess
- b. Purposely creating undesirable situations to test the student teacher:
  1. Rowdiness
  2. Continuation of undesirable activity after being asked to cease activity

3. Distracting Behavior:

Overt student or students behavior which is annoying to other class members and/or attracts their attention away from the teacher or class objectives.

Examples:
  a. Talking to neighbor
  b. Tapping sounds created by feet, hands, or other instruments
  c. Rib or back poking behavior
  d. Closing another student's book
  e. Dropping objects on the floor
  f. Whispering

4. Disorderly Conduct:

Overt student or students behavior which is detrimental and is disruptive to ongoing classroom activities, and/or is in opposition to teacher or class objectives. Behavior that if left unattended, could erupt into a complete breakdown of classroom discipline.

Examples:
  a. Pushing furniture
  b. Fighting
  c. Arguing
  d. Teasing
  e. Racing
  f. Beligerance

5. Fatigue:

Overt student behavior which is contrary to a student or student's normal behavior in which the student (s) may look physically tired.

Examples:
  a. Drowsiness (caused by abnormal room temperature or illness)
  b. Unusual quick temper
  c. Lack of usual vigor

OPERATIONAL DEFINITIONS OF STANDARDS

1. Rules of procedure--Defers to authority:

In situations involving rules of procedure, when the student teacher is not informed of rules, the student teacher defers to some authority (e. g., the supervising teacher).

Example:
a. "I don't know the procedure. I'll check with Mr. (Mrs., Miss) . . ."
b. "I am not sure of the policy. Ask Mr. (Mrs., Miss) . . ."

2. Shows supporting manner:

When the student teacher responds or reacts to a class or an individual or individuals' desirable or undesirable behavior, she/he exhibits behavior which is warm and reassuring to the individual (s) or the class. Teacher response may be corrective in nature, but still warm and reassuring.

Example:
a. "That's fine, Jack, as far as you went. Can someone add to Jack's description?"
b. "Very good."
c. "Thank you."
d. "May I help you?"
e. A friendly smile.
f. A gentle pat on the back or placement of hand on a shoulder.
g. "Don't do that, Jack. That's a good boy."

3. Class disinterested or confused--Stimulates a more active, interesting response:

When the class or individuals appear disinterested or confused, the student teacher attempts to stimulate a more active, interested response.

Example:
a. Gives other students a chance to participate. "Well, class, can you help Karen out?"
b. Changes mode of presentation. Changes from lecture to demonstration; from demonstration to play-acting, uses chalkboard.
c. Uses different approach or simpler language.
d. Shifts to getting information from the class. "What is it that you do not understand?"

4. Attentive to class as well as individual:

In instructional situations where one student's comments or questions can monopolize the student teacher's attention (to the detriment of on-going class instruction) the student teacher is attentive to the entire class as well as the individual.

Example:
a. Give a brief explanation to an individual.
b. Involve the class: "Class, can you help Carol?"

5. Discourages undesirable behavior:

When learners exhibit undesirable behavior (e. g., interrupt discussion purposely with an inappropriate comment, is rude, is loud, or exhibits any behavior which disturbs or distracts from the on-going classroom activity) the student teacher discourages the behavior.

Example:
a. Withholds praise.
b. If student has no justifiable reason for exhibiting a behavior, the student teacher extinguishes it. "Carol, return to your seat." "Bob, the reason for your discussion with John is not appropriate at this time. You can discuss the problem with him during the science lesson."

6. Disruptive group or individual--Acts quickly:

When direct action is required to control a disruptive group or individual(s), the student teacher acts quickly before the disruption has time to spread.

Example:
a. The student teacher gives forethought to situations and anticipates classroom management problems before they occur.
b. As soon as the disruption is noticed the student teacher restores order immediately. "Jack, John, and Dick. Return to your seats." "Class, return to your seats."

7. Disruptive group or individual--Communicates at close range:

When direct action is required to control a disruptive group or individual(s), the student teacher moves in and communicates at close range.

Example:
Attempts to stop class or individuals by moving in toward the individual or group.

8. Encourages student initiative to learn:

When an opportunity exists to encourage a student or students for a task, the student teacher encourages student initiative to learn.

Example:

a. Commends a learner's efforts at outside readings or extra library work. "You did an excellent job, Jack. By completing the outside readings you have shown real initiative."
b. The student teacher encourages students to express, explore, and explain concepts.
   1. "Tell us about . . . Jack."
   2. "Decide where you can find more information about . . . and explore your problem further."
   3. "Explain the purpose of . . ., Carol."
c. The student teacher does not publicly call attention to an individual's shortcomings or errors so as to place the learner in an embarrassing position.

9. Behavior which deviates from objectives--Avoids disrupting instruction:

When learners are disruptive in a situation that is fulfilling instructional objectives (e. g., an organized discussion, group, or class activity), the student teacher deals with the individual(s) directly with minimal disruption of instructional continuity.

Example:

a. Deals with student or students privately at close range.
b. Avoids calling class's attention to disruptive individual(s). Says quietly, "Sit down, Jack." "Get back to your work, Jack."
c. Asks deviant student to recite or do something. "What is the reason that . . ., Jack?" "Read that last paragraph for us, Jack."
d. Walks up to individual and gently taps individual on the shoulder.

10. Encourages correction of inappropriate responses:

When learners make an inappropriate response (e. g., mispell a word on chalkboard, make errors while reading orally), the student teacher encourages the learner(s) to replace it immediately with an appropriate response.

Example:

a. "If you have mispelled the word, correct it."
b. "The word is pronounced as . . . Try it again, Jack."
c. "The formula is . . . Correct it, Jack!"

11. Conflicting parent-school interests--Remains neutral:

When confronted with conflicting parent-school interests (e. g., a student pits his parents against a teacher), the student teacher maintains a neutral behavior.

Example:

a. Places the question before the student. "What do you think about it?" "Do you have any idea how you might change the . . .?"
b. Involve the class. "Class, how can Carol solve her problem?"

OPERATIONAL DEFINITION RATING CRITERIA

How Did the Student Teacher Handle the Situation?

1. Adequately Elicited desirable student behavior. Definite positive result.

2. Acceptable Changed on-going student behavior toward a desirable direction. Results might be positive.

3. Inadequately Elicited undesirable student behavior or did not affect the present on-going undesirable behavior. Undesirable or no effect on behavior.

Recheck after approximately 30 seconds by circling (①) if still appropriate and replacing if not appropriate.

APPENDIX I

APPENDIX I

CONFIDENCE SCALE

1. I am confident that I have the skills necessary to work effectively with pupils in small groups.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

2. I am confident that I have the skills necessary to work effectively with pupils in large groups (entire class).

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

3. I am confident that I have the skills necessary to maintain the interest of a class.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

4. I am confident that I possess the necessary skills to cope with individual discipline problems.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

5. I am confident that I possess the necessary skills required to cope with group discipline problems.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

6. I am confident that I know how to study individual pupil and school records carefully as a basis for evaluating pupil behavior and progress.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

7. I am confident that I understand the problems of upper elementary children.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

8. I am confident that I have the necessary skills to deal appropriately with unexpected situations as they develop.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

9. I am confident that I will <u>enjoy</u> my first teaching position.

_______ Very Confident

_______ Confident

_______ Uncertain

_______ Very Uncertain

APPENDIX J

APPENDIX J

STUDENT REACTIONS TO SIMULATOR TRAINING

This instrument is an attempt to determine your attitude toward your classroom simulator experience. Feel free to express your feelings toward the experience. This information will in no way affect your grade in the Elementary Bloc.

I. Please write a brief paragraph about how you feel concerning your simulator experience. If more space is needed use reverse side of page.

II. Please read the following statements about the classroom simulator and state your feelings about each statement by checking (✓) each statement below that expresses your sentiment.

1. I enjoyed receiving training in the classroom simulator.

_______ a. Very much so

_______ b. Somewhat

_______ c. Not particularly

_______ d. Not at all

2. The classroom simulator was realistic--"life like."

_______ a. Very realistic

_______ b. Realistic

_______ c. Not particularly realistic

_______ d. Not realistic at all

3. "Acting out" my response to the problems made me feel like I was involved in the situation.

_______ a. Very involved

_______ b. Involved

_______ c. Not particularly involved

_______ d. Not involved at all

4. The discussion accompanying training was valuable in developing the concepts.

_______ a. Very valuable

_______ b. Valuable

_______ c. Not particularly valuable

_______ d. Not valuable at all

5. I believe that the simulator experience was meaningful in its relation to real classroom problems.

_______ a. Very meaningful

_______ b. Meaningful

_______ c. Not particularly meaningful

_______ d. Not meaningful at all

6. I feel that my experience in the classroom simulator will help me to identify classroom problems.

_______ a. Very helpful

_______ b. Helpful

_______ c. Not particularly helpful

_______ d. Not helpful at all

7. I believe that my experience in the classroom simulator has helped me develop methods of coping with classroom problems.

_______ a. Very helpful

_______ b. Helpful

_______ c. Not particularly helpful

_______ d. Not helpful at all

8. The classroom simulator made the concepts more meaningful than if they had been presented in lectures.

_______ a. Much more meaningful

_______ b. More meaningful

_______ c. As meaningful

_______ d. Less meaningful

_______ e. Much less meaningful

9. I believe that the classroom simulator experience should be provided on an individual basis.

_______ a. Strongly agree

_______ b. Agree

_______ c. Disagree

_______ d. Strongly disagree

10. I believe that the classroom simulator experience could be provided to small groups (up to six students) just as effectively.

_______ a. Strongly agree

_______ b. Agree

_______ c. Disagree

_______ d. Strongly disagree

11. I believe the classroom simulator experience could be provided to an entire class (40 to 60 students) just as effectively.

    ______ a. Strongly agree

    ______ b. Agree

    ______ c. Disagree

    ______ d. Strongly disagree

12. I would recommend classroom simulator experience to my friends.

    ______ a. Strongly recommend

    ______ b. Recommend

    ______ c. Advise against

    ______ d. Strongly advise against