

THE APPLICATION OF GOAL SETTING IN THE
INDIVIDUALIZED CLASSROOM

BY

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Chapter 1

INTRODUCTION

Individualization of instruction has woven its way through American education almost from the beginning of our history. However, the reemergence of individualization of instruction is one of the most pronounced features of American education in the 1970's. This renewed emphasis on individualization of instruction has brought forth a myriad of new or revised curricula both commercially developed and developed within the local schooling subdivisions. The general intent of all individualized curricula has been to provide an instructional framework which will provide the learner the freedom to work through the material at his own pace based on his ability and motivation to master the subject. Many of the individualized schemes have also provided the learner with options concerning the topics and depth of his studies. Also inherent within individualized curricula has been the goal of freeing the teacher from the more traditional role of group lecturer to a resource and counselor for individuals and small groups.

However, along with the individualized curricula has come an equally numerous variety of schemes for the day-to-day management of the instruction and progress of the students. These management schemes range from sophisticated and expensive computerized systems, to elaborate record keeping systems based on the achievement of specific behavioral objectives, to the belief that the instructional format and

content will provide sufficient motivation to guide the progress of the student. Frequently, these management systems result in such an avalanche of record keeping paper work for the instructor that they defeat one of the goals of individualizing instruction--that of freeing the instructor for the role of resource personnel and counselor. This record keeping syndrome for the management of the system may eventually result in a breakdown of the entire instructional system. In other cases, the systems may lack the motivational forces necessary to keep the instructional system operating--particularly for the student who lacks the skills for operating in a system where he must make choices and decisions about the utilization of his time and the direction of his studies. These and other design and management problems may lead the instructor into modifications of the individualized curriculum that in some cases subvert the intent of self-paced systems.

One modification of individualized curricula that may be observed in the classroom is the requiring the completion of a set amount of material, predetermined by the instructor, for all students. Another practice that may be observed is grading based on the amount of material covered by the student. These practices obviously subvert the self-paced nature of individualized curricula. Perhaps an even more serious effect of these and similar practices is that they attempt to replace intrinsic motivation with extrinsic motivation, in extreme cases to the extent that they may destroy all motivation by creating a situation in which the student perceives no hope of succeeding. If, however, a classroom setting can be created that enhances the intrinsic motivation of the student, not only may the intent of individualization be served, but the management problems for the instructor may be reduced.

Goal setting, a process of an individual or institution predetermining what its desired accomplishments and outcomes shall be, is a technique frequently used in business, business management and even educational management to increase the efficiency of the individual or the organization. If the goals are not met, it may mean the reexamination of either the goals themselves or a reexamination of the practices and procedures used in the attempt to accomplish those goals. But, the consequences for not meeting those goals are not necessarily any more severe than the revising of the goals or the techniques and procedures. However, the goal setting procedure provides the direction and motivation for efficient operation. If the goal setting technique can be applied to the individualized curricula, it may well provide some motivation and efficiency to the individual operating within the system and relieve some of the management responsibilities of the instructor by placing a part of those responsibilities on the student.

If a goal setting procedure is to be incorporated into an individualized curriculum to provide maximum intrinsic motivation, several conditions would have to be satisfied. First, the goals must be determined by the individual student based on his own self-concept of what he desires to accomplish and what he is capable of accomplishing. Secondly, those goals should be established in an atmosphere that is free from extrinsic motivational forces of teacher domination or control. Finally, those goals must be set and evaluated by the individual at intervals frequent enough to provide feedback to the individual for the evaluation of the goals for revision and/or the practices used in the attempt to accomplish them. It is the purpose of this research to determine if such a procedure is possible and that if it provides

sufficient intrinsic motivation to increase the efficiency of the student within an individualized classroom setting.

Need for the Study

The motivational and management problems of individualized instruction require that some solutions be sought that will provide intrinsic motivation for the student to become more responsible for his progress through the course of study. If solutions can be found that will provide the impetus for student self-management, then logically, some of the management problems should be relieved from the instructor. It is proposed that goal setting is a technique that will resolve some of the motivational and management issues encountered in individualized curricula.

Finally, in a study on the effect of goal setting on achievement, attitudes and goal setting behavior, it was concluded that,

Implementation of the procedures developed and examined in this study by classroom teachers should produce larger differences in that more accurate feedback can be provided and a more constant rapport established.

The study continues,

Goal setting procedures must now be more fully evaluated in everyday classroom use, but tentatively they provide the teacher with an important motivational technique to improve student achievement.¹

Statement of the Problem

The basic question that needs to be answered is whether or not it is possible to introduce a procedure into individualized curriculums

¹John Gaa, "Goal Setting Conferences on Achievement, Attitudes and Goal Setting Behavior", Journal of Experimental Education, 42, #1, (Fall 1973), 22-28.

that will improve the students' ability to assume responsibility for their own progress through the course of studies. Specifically, the questions that must be answered are: (1) will goal setting and evaluation increase the efficiency with which students are able to direct their progress by decreasing the amount of time required for them to complete a unit of individualized instruction? (2) What effect will the goal setting procedure have on content test scores? (3) What effect will the procedure have on the students' perceptions and attitudes toward the course of study and their ability to function within an individualized setting.

Additionally, the particular research design will permit the examination of the effect of pretesting on completion time, test scores and attitudes.

Null Hypotheses

I. There shall be no significant difference in the time required to complete a unit of individualized instruction for groups experiencing goal setting and those not experiencing goal setting.

II. There shall be no significant difference in the content test scores for groups experiencing goal setting and those not experiencing goal setting.

III. There shall be no significant difference in attitudes between groups that utilized goal setting procedures and those that did not utilize goal setting procedures.

IV. There shall be no significant difference in the time required to complete a unit of individualized instruction for groups that took a pretest and those that did not take a pretest.

V. There shall be no significant difference in the content test scores for groups that took a pretest and those that did not take a pretest.

VI. There shall be no significant difference in attitudes between groups that took a pretest and those that did not take a pretest.

VII. There shall be no significant interaction between goal setting and pretesting as measured by completion time.

VIII. There shall be no significant interaction between goal setting and pretesting as measured by content test scores.

IX. There shall be no significant interaction between goal setting and pretesting as measured by the attitudinal survey.

Definition of Terms

Goal setting procedure--The process of setting goals of desired outcomes and subsequently evaluating the degree of accomplishment of those goals by feedback provided by knowledge of results. For the purpose of this study, the goal setting procedure shall be limited to individually established goals by the student in two areas--amount of curriculum material to be covered and desired level of performance on content tests.

Goal evaluation--An integral part of goal setting in which the reality of accomplishment is compared to the previously established desired outcomes.

Knowledge of results--The feedback of actual accomplishments and levels of performance that provides the basis for goal evaluation.

Individualized instructional programs--A course of study that is self-paced and allows the student some freedom of choice in the sequence and depth of his studies. For the purpose of this study, individualized

instructional programs, individualized instruction and individualized curricula shall be used interchangeably.

Self-paced--That instructional strategy that allows the student to work through a course of study at a rate based on his perception of his ability and motivation.

Completion time--For the purposes of this study, completion time shall be operationally defined as the number of instructional class periods, between the date that the unit is started and the completion of the content test at the end of the unit, required for a student to complete an instructional unit.

Chapter 2

REVIEW OF RELATED LITERATURE

A systematic search of education and psychology journals yielded a rather limited number of articles dealing with the application of goal setting procedures to the accomplishment of specific tasks or desired instructional outcomes. A computer search of ERIC linking goal setting to individualized instruction, individualized curricula or individualized programs yielded only sixteen citations. A subsequent review of those citations produced only two containing any substantial information on goal setting and individualized instruction.

Goal Setting and Achievement

Goal setting procedures have been studied in the laboratory over a wide range of tasks and desired outcomes, and to a lesser degree to a range of time intervals between goal setting, provision of knowledge of results and goal revision. From these studies it can generally be concluded that goal setting does indeed raise the achievement on the assigned task or desired outcome.²⁻³⁻⁴⁻⁵⁻⁶ The studies of goal setting

²J.F. Bryan and E.A. Locke, "Goal Setting as a Means of Increasing Motivation", Journal of Applied Psychology, 51 (1967), pp. 274-277.

³Edwin A. Locke, "Relationship of Intentions to Levels of Performance", Journal of Applied Psychology, 50 (1966), pp. 60-66.

⁴F.W. Fryer, An Evaluation of Level of Aspiration as a Training Procedure, (Englewood Cliffs, New Jersey: Prentice-Hall, 1964).

⁵E.A. Locke and J.F. Bryan, "The Directing Function of Goals in

procedures as applied in the classroom for purposes of increasing achievement are more limited. However, the classroom applications of goal setting also concluded that goal setting procedures raises the achievement of subjects as reported in a study on an individualized reading program.

The influence of the goal-setting conferences on achievement produced significantly greater achievement on the criterion referenced tests for the goal setting group. As pointed out earlier (in the study), the differences in achievement was not the result of a single subtest alone, but was consistent across measures.⁷

In addition to the effect of goal setting procedures on achievement, it is important to note that more than one type of measurement may be used to measure achievement. In this study, two types of achievement measures were used--content test scores and completion time. Only one study could be located that used work rate, completion time as defined in this study, as a measure of achievement. However, it concluded that goal setting could be effective in increasing the completion rate.⁸

In a classroom application of goal setting and arithmetic achievement it was concluded that,

Although none of these comparisons reached statistical significance at the .05 level, the results are in the hypothesized direction; that is, the children receiving conferences attained higher than those not receiving conferences, specific goals led

Task Performance", Organizational Behavior and Human Performance, 4 (1969), 35-42.

⁶J.A. Bayton, "Performance as a Function of Expressed and Non-Expressed Levels of Aspirations", American Psychologist, 3 (1948).

⁷Gaa, loc. cit.

⁸E.A. Locke and J.F. Bryan, "Knowledge of Score and Goal Level as Determinants of Work Rate", Journal of Applied Psychology, 53 (1969), 59-65.

to higher attainment than general (do best) goals, and self-set goals produced higher achievement than teacher-set goals.⁹

The difference in effect of self-set goals and teacher-set goals is worthy of note. In this current study, self-set goals are utilized.

Another study on goal setting used to improve student conduct sheds some light on the use of individual versus group goal setting conferences. This is, whether the teacher confers individually with each student before the student sets his goals or whether the teacher confers with a group of students before they set their individual goals. This study was conducted school-wide, K-6, with a total of 628 students but over a short period of time with only four goal setting sessions for each student. The students set their own goals (non-directive). Teacher comments indicated that they believed that the goal setting procedures would have been even more effective if the goals had been tied to a subject matter area rather than conduct.

. . . individual conferences produced greater gains than did the control but the group conferences did not. This, of course, indicates that individual conferences may be more effective than group conferences, but group conferences may still be quite effective.

The study continues,

In conclusion, further study of the use of individual and group conferences utilizing the non-directive approach with goal setting seems to be warranted on the basis of the results of this pilot study.¹⁰

⁹Elizabeth Schwenn Ghatala, editor, Effectiveness of Individually Guided Motivation: A Summary of Emperical Evidence, Technical Report #355, Part 1, Wisconsin Research and Development Center for Cognitive Learning, (Madison, Wisconsin: University of Wisconsin, Dec. 1975).

¹⁰Juanita S. Sorenson, Elizabeth A. Schwenn and James L. Bavry, The Use of Individual and Group Goal-Setting Conferences as a Motivational Device to Improve Student Conduct and Increase Student Self Direction: A Preliminary Study, Technical Report #123, Wisconsin Research and Development Center for Cognitive Learning, (Madison, Wisconsin: The University of Wisconsin, March 1970).

The study conducted by Sorenson, Schwenn and Bavry indicates that although individual conferences may be more effective, group conferences may still produce the desired outcome.¹¹ Because of the cost and time factors of personnel necessary to conduct individual goal setting conferences, this current study will utilize group conferences before the individual students set their goals.

In all of the school setting studies cited, the goal setting procedures were conducted at weekly intervals.¹²⁻¹³⁻¹⁴ Although this study will utilize weekly goal setting intervals, that particular interval may not be necessary.

Previous studies had found a positive, linear relationship between goal level (difficulty) and level of performance using tasks of 10 to 120 minutes in duration. The present findings replicated these earlier results, using a time span of more than four months. Thus goals were shown to serve a useful explanatory and prediction function in the long term as well as in the short term.¹⁵

Goal Setting and Knowledge of Results

Goal setting is not an isolated skill. Goal setting and goal evaluation as facilitated by knowledge of results must be integrated into a goal setting procedure. Several studies have examined the relationship between goal setting and knowledge of results and have concluded that

¹¹Ibid.

¹²Gaa, loc. cit.

¹³Gratala, loc. cit.

¹⁴Sorenson, Schwenn and Bavry, loc.cit.

¹⁵Edwin A. Locke and Judith F. Bryan, "Grade Goals as Determinants of Academic Achievement", Journal of General Psychology, 79 (1966), 217-228.

neither, by itself, is necessarily sufficient to produce significant gains in achievement.¹⁶⁻¹⁷⁻¹⁸

One such study concluded,

It appears that S's knowledge of the total score under the conditions of our experiment does not result in any automatic gain in performance. Rather, our results suggest that it is what the S does with that knowledge, i.e. what kinds of performance goals he sets with it, that is important.¹⁹

In other words, once the initial goals are established and the subject works toward those goals, knowledge of results must be supplied to the subject for them to evaluate their goals so that they may revise and reset their goals or modify their behavior in attempting to reach their goals.

Goal Setting and Attitudes

The studies of the relationship between goal setting procedures and attitudes are not consistent but appear to be dependent on other variables such as the difficulty of the goals set.²⁰⁻²¹⁻²² If the

¹⁶Edwin A. Locke, "The Relationship of Task Success to Task Liking: A Replication", Psychological Reports, 18 (1966), 60-66.

¹⁷Edwin A. Locke, "Motivational Effects of Knowledge of Results: Knowledge or Goal Setting?", Journal of Applied Psychology, 51 (1967), 324-329.

¹⁸Edwin A. Locke, N. Cartledge and J. Koepfel, "Motivational Effects of Knowledge of Results: A Goal-Setting Phenomenon?", Psychological Bulletin, 70 (1968), 474-485.

¹⁹Edwin A. Locke and Judith F. Bryan, "The Effects of Goal-Setting, Rule Learning and Knowledge of Score on Performance", American Journal of Psychology, 79 (1966), 451-457.

²⁰Gaa, loc. cit.

²¹B.J. Kennedy, Motivational Effects of Individual Conferences and Goal Setting and Performance and Attitudes in Arithmetic, Technical Report #61, Wisconsin Research and Developmental Center for Cognitive Learning,

subject's goals are set too high, the subject is less likely to harbor favorable attitudes toward the task although his achievement may still be high.²³ So, although there is a theoretical and empirical link between goal setting and attitudes toward the task it is not necessarily a direct one.

Summary of Review of the Literature

There does appear to be strong theoretical and empirical support for the basis of this current study. Although most of the previous studies were conducted in a laboratory setting with often artificial tasks, the few classroom studies on goal setting support the laboratory work and provide a basis for all of the considerations to be examined in this current study.

(Madison, Wisconsin: The University of Wisconsin, 1968).

²²Edwin A. Locke, "The Relationship of Task Success to Task Liking and Satisfaction", Journal of Applied Psychology, 50 (1965), 60-66.

²³Ibid.

Chapter 3

RESEARCH PROCEDURES

Plan of the Study

This study was designed to examine the effect of goal setting procedures on content test scores, completion time and attitudes in a classroom setting. In order to keep the setting and procedures as close as possible to normal, several conditions had to be met; (1) the curriculum had to be the normal school curriculum, (2) The measurements had to be unobtrusive wherever possible, and (3) any experimental treatments had to be established as normal, regular classroom procedures.

The curriculum used in this study was the commercial, modular adaptation of the Intermediate Science Curriculum Studies (ISCS) Level II, copyrighted in 1976.^{23a} The Intermediate Science Curriculum Studies was originally developed at Florida State University with funding from the National Science Foundation and published by the Silver-Burdett Co. ISCS was developed as a three year sequential curriculum; Level I - 7th grade, Level II - 8th Grade, and Level III - 9th grade. The particular adaptation used, consisting of seven modules, was the normal curriculum for 8th grade students at the LaVista Junior High School of the Papillion-LaVista School District (Nebraska) in which the study was conducted. The ISCS Level II modular adaptation is an individualized

^{23a} Ernest Burkman, Stewart P. Darrow, David D. Redfield and William R. Snyder, The Natural World Modules, Level 2, (Morristown, New Jersey: Silver-Burdett Co., 1976).

program that allows self-pacing and some student choice over the depth of his studies. Of the seven modules available in the curriculum, three were directly utilized in this study. In order of their use, they were Gases, Gases Everywhere, Building Blocks of Matter and Mixing Up Matter. Gases, Gases Everywhere was used to verify the randomness of the assignment of subjects to groups and Building Blocks of Matter and Mixing Up Matter are used for trials 1 and 2, respectively, in the collection of data.

The plan was to introduce a goal setting procedure into a portion of the 8th grade science classes and subsequently compare their completion times, content test scores and attitudes with classes not utilizing goal setting procedures. Simultaneously, some of the classes would be utilizing pretests to compare the effectiveness of pretesting to goal setting in increasing achievement, as measured by completion time and content test scores, and improving attitudes.

Population

The study occurred during the fall term of the 1976-77 school year in the LaVista Junior High School of the Papillion-LaVista School District (Nebraska School District #27). The school district in a suburban area of Omaha, Nebraska and the LaVista Junior High School attendance area is predominately in a lower middle class neighborhood, drawing its student population from that area.

From a pool of approximately 225 eighth grade students enrolled in the school at the beginning of the school year, 104 were randomly assigned to four treatment groups which subsequently became four separate classes. Since the assignment of the subjects to groups was not under the author's control but was done by computer in the normal scheduling

process with specified parameters of priority scheduling of random, heterogeneous groups, three statistical checks were conducted with the groups to assure the randomness of assignment before any experimental treatment was initiated. First, composite test scores from Science Research Associates Achievement Series were collected for each of the subjects from tests administered in the spring of the previous school year, 1975-76. These composite test scores were sorted into groups to correspond to the treatment groups and a one-way ANOVA was conducted to detect any significant difference in the achievement scores between the groups at the .05 level of confidence. The results of that analysis detected no significant difference in the groups. (See Table #1)

Then, before any treatment was administered, the subjects were started on and worked through the first individualized unit of instruction. The completion times for each subject were recorded and the content test scores for each subject was recorded. Each of these sets of data, completion time before treatment and content test scores before treatment, were then subjected to independent one-way ANOVAs to detect any significant difference between the groups at the .05 level of confidence. The results of the analysis detected no significant differences between the groups for either completion time or content test scores. (See Tables #2 and #3)

From the results of the three analyses on SRA composite scores, completion time for a unit of instruction without treatment and content test scores without treatment, it can be assumed that the computerized scheduling system did indeed assign the students in a random fashion. For purposes of clarity, from this point forward, the following designations shall be used for each of the groups and their treatments:

Group I: Goal setting conferences and pretesting.

Group II: Goal Setting conferences only.

Group III: Pretesting only.

Group IV: Neither goal setting conferences or pretesting
(control).

Table #1

Group Means, Standard Deviations and ANOVA
for SRA Composite Test Scores

Group	Mean	Standard Deviation
I	101.88	12.65
II	105.05	14.34
III	108.14	12.11
IV	114.48	17.14

ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	2046.23	682.08	2.08	.152
Within	104	34057.91	327.48	XXX	
Total	107	36104.14	XXX	XXX	

Table #2

Group Means, Standard Deviations and ANOVA
for Completion Time Before Treatment

Group	Mean	Standard Deviation
I	13.17	4.14
II	14.15	5.69
III	14.18	5.91
IV	14.70	5.77

ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	32.53	10.84	.35	.555
Within	104	3247.12	31.22	XXX	
Total	107	3279.65	XXX	XXX	

Table #3

Group Means, Standard Deviations and ANOVA
for Content Test Scores Before Treatment

Group	Mean	Standard Deviation
I	29.61	5.65
II	29.44	6.54
III	29.43	5.44
IV	25.57	6.55

ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	309.90	103.30	2.49	.064
Within	104	4314.54	41.49	XXX	
Total	107	4624.44	XXX	XXX	

Measurements

In order not to disrupt normal classroom procedures, the measurements of achievement were designed to be unobtrusive. That is, either hidden from the subjects' awareness or procedures that are normally a part of accepted classroom procedures. Both the completion time and the content test scores were unobtrusive measurements. The attitude test scores were not collected as part of the normal classroom procedure but the administration of the instrument was not done until the end of the experimental period so as not to influence the results of the experiment. A description of the measuring instruments, completion time, content tests and attitudinal survey, will each be dealt with in a separate section.

1. Completion time. As previously defined, completion time is the number of instructional class periods, between the date that a unit is started and the completion of the content test at the end of the unit, required for a student to complete an instructional unit. Completion time is used as a measure of achievement of the amount of work accomplished. The logic behind the selection of completion time is one of efficiency. If a student is working to capacity, if he is working efficiently, he will complete the instructional unit in a shorter time.

The validity of completion time as a measurement is a question of face validity. That is, the validity is self-evident. Since the criterion is efficiency as measured as a function of time, almost any time unit would have face validity.

The reliability of completion time is a somewhat more difficult concept to isolate. The traditional statistical measures of reliability

are inappropriate. However, several checks were used to gather consistent, reliable data of completion time. The completion date of the previous unit of instruction always provided the starting date for the next unit. The completion date could be verified in three ways; (1) when the student requested the content test at the end of a unit, (2) the date on the test, and (3) the date the test was graded and recorded. The days that the subjects were absent for any reason were not counted in the completion time but the time required to administer any experimental treatment, i.e. the group goal setting conferences, was included in the completion time.

2. Content tests. Since unobtrusiveness was one of the desirable features of measurements in this study, the logical choice for use in measuring content achievement was the utilization of the testing material supplied with the ISCS program.^{23b} By using the normal tests that accompany the curriculum and administering them at the end of instructional units, as would normally occur, there is little chance that the testing procedure itself would effect the results of the study. The use of the published ISCS testing materials provide another advantage. In seeking ways to improve classroom achievement, the teacher is often referring to achievement on normal quizzes and exams administered as part of the curriculum. If goal setting procedures do indeed raise achievement, as measured by the content test scores, then the use of the normal classroom tests in the experimental procedures will respond to the need of teachers to raise classroom performance.

^{23b} Individualized Testing System: Performance Checks, ISCS Level II, Forms A, B, and C, (Morristown, New Jersey: Silver-Burdett Co., 1973).

The validity of the ISCS testing material and subsequently the unit tests used in this study, must be based on the authority of the authors of the curriculum. No empirical tests for the validity were conducted on the content tests.

The reliability of the ISCS testing material may be in question since no empirical tests were conducted. Empirical tests were not conducted because the unequal weighting of the items within the tests made traditional tests of reliability difficult. However, to assure consistent scoring on the tests, each test was scored strictly on predetermined criterion and item weighting.

3. Attitudinal Survey. (See Appendix A) The attitudes to which this study wished to address itself were: (1) What attitudes do the students harbor toward scientific concepts, methods and science as a discipline? (2) What attitudes do the students harbor toward the organization of this specific course? and (3) How do the students perceive their ability to function in this specific course? No attitudinal survey could be located that met the three criteria. So, a survey item pool was created based on the criteria. This item pool was subsequently review by several other experienced science teachers. This review resulted in the deletion of some items, the revision of others for clarity and the addition of other items. The resulting item pool was then independently reviewed by the tests and measurement personnel with the school district by judging the items against the three criteria. The resulting items were then randomly assigned an order and printed for the survey.

The validity of the survey rests with the three independent sources of items and review as judged against the criterion for the items.

Although no empirical tests were conducted on the survey, it does appear to have content validity.

The reliability of the attitudinal survey was established in two ways. (1) A split-half method, using a Pearson correlation coefficient with subsequent compensation with the Spearman-Brown prophecy formula and (2) the Kuder-Richardson formula 21 was utilized. The resulting reliability figures and standard errors of measurement figures indicate that the attitudinal survey is indeed very reliable. (See Table #4)

Administration of the Experimental Procedures

Once the randomness of the groups had been verified, the experimental procedures were introduced. For those groups receiving group goal setting conferences as a treatment, the conferences were held the first day of each week. The students setting goals were given a form that required the subject to explain where they were in the module, how far they aspired to get during week and, if they were finishing a unit and planned to take a content test, what grade they aspired to get on the test. (See Appendix B) At the goal setting conference the next week, the form from the previous week was returned and the subjects were asked to compare the goals they had set to what they actually accomplished before filling out the goal setting form for the current week. The goal setting conferences required approximately one half of a class period each week but this time was still counted as part of the completion time. Over the 90 class-day semester that this study was conducted, this meant that those subjects receiving goal setting as a treatment had approximately 10% less actual working time than those groups not receiving goal setting conferences. While the subjects were filling out the goal setting form the author, as instructor of the class, assumed a non-directive

Table #4
Reliability of Attitudinal Survey

Test	Reliability	Standard Error of Measurement
Split-Half Method	.98	2.70
Kuder-Richardson ₂₁	1.00	.00

(Mean = 13.14, σ = 19.11, N = 103)

role in the determination of the individual subject's goals. As instructor, the author's role during the group goal setting conferences was to reinforce the purpose of the goal setting form; to get the subjects to carefully examine their previously set goals in relationship to what they actually accomplished and then to set new goals based on their evaluation of the goals and the efficiency with which those goals were accomplished. Part of this time was also used to provide knowledge of results to individual subjects on pre and post content test scores to facilitate the setting of goals in regards to the test scores. At no point in time were the goals teacher-set, this was the responsibility of each student based on his perception of ability level and motivation.

The groups receiving pretests as a treatment took the pretests immediately before beginning a unit. The pretest were parallel forms of the content test taken at the end of the units. The items for the pretests were also drawn from the published ISCS material (ISCS material includes three equivalent test forms.) After taking the pretests, the pretests could be reviewed by the subjects under instructor supervision. This allowed the subjects to identify areas of weakness on which to concentrate their studies.

The experimental procedures were followed for the entire fall semester. The first two complete sets of data were analyzed and included in this study. More data was collected on completion times and content test scores than actually analyzed but, because of the differing work rates within groups and between groups, the remaining data on completion times and content test scores is incomplete. The experimental treatments were maintained throughout the entire semester, even though many of the subjects had completed the instructional units on which the analyses

were to be conducted, so as not to disturb or effect the slower subjects that had not yet completed those units.

During the semester of the experimental treatments one student was lost from the study due to family relocation. All data from that student was removed from the study due to its incompleteness. With that one exception, all subjects remained throughout the entire study and the initial group assignments remained intact.

Research Design, Analysis and Levels of Confidence

The research design was a Solomon Four Group procedure. As suggested for a Solomon Four Group procedure, the actual pretest scores were disregarded and the pretest was analyzed as a second dimension in a simple 2 X 2 ANOVA.²⁴ Since there was some difference in group size, the harmonic mean of the group sizes was utilized to compensate for this difference in calculating the ANOVA.²⁵ In addition, a Bartlett's Chi-squared value was calculated for each ANOVA as a check on the homogeneity of variance assumption.

The acceptable confidence level for the rejection of any null hypothesis was established at the .05 level. For any significant F-value a strength of association (ω^2) was computed.^{25a}

²⁴Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research, (Chicago: Rand McNally College Publishing Co., 1963), p. 25.

²⁵B.J. Winer, Statistical Principles in Experimental Design, 2nd Ed., (New York: McGraw-Hill Book Company, 1971), pp. 402-404.

^{25a}Henry E. Klugh, Statistics: The Essentials for Research, 2nd Ed., (New York: John Wiley & Sons, Inc., 1974), pp. 294-295.

Chapter 4

RESULTS

Main Effects

I. There shall be no significant difference in the time required to complete a unit of individualized instruction for groups experiencing goal setting and those not experiencing goal setting.

Trial 1: Reject null hypothesis.

$p < .0001$ $\omega^2 = 12\%$

(See Table #5)

Trial 2: Reject null hypothesis.

$p < .0016$ $\omega^2 = 8\%$

(See Table #6)

II. There shall be no significant difference in the content test scores for groups experiencing goal setting and those not experiencing goal setting.

Trial 1: Retain null hypothesis.

$p < .123$

(See Table #7)

Trial 2: Retain null hypothesis.

$p < .730$

(See Table #8)

III. There shall be no significant difference in attitudes between groups that utilized goal setting procedures and those that did not utilize goal setting procedures.

Retain null hypothesis.

$p < .095$

(See Table #9)

IV. There shall be no significant difference in the time required to complete a unit of individualized instruction for groups that took a pretest and those that did not take a pretest.

Trial 1: Retain null hypothesis.

$p < .221$

(See Table #5)

Trial 2: Retain null hypothesis.

$p < .092$

(See Table #6)

V. There shall be no significant difference in the content test scores for groups that took a pretest and those that did not take a pretest.

Trial 1: Retain null hypothesis.

$p < .109$

(See Table #7)

Trial 2: Retain null hypothesis.

$p < .591$

(See Table #8)

VI. There shall be no significant difference in attitudes between groups that took a pretest and those that did not take a pretest.

Retain null hypothesis.

$p < .266$

(See Table #9)

Interaction Effects

VII. There shall be no significant interaction between goal setting and pretesting as measured by completion time.

Trial 1: Retain null hypothesis.

$$p < .921$$

(See Table #5)

Trial 2: Retain null hypothesis.

$$p < .719$$

(See Table #6)

VIII. There shall be no significant interaction between goal setting and pretesting as measured by content test scores.

Trial 1: Retain null hypothesis.

$$p < .561$$

(See Table #7)

Trial 2: Fail to retain null hypothesis.

$$p < .049 \quad \omega^2 = 3\%$$

(See Table #8)

IX. There shall be no significant interaction between goal setting and pretesting as measured by the attitudinal survey.

Reject null hypothesis.

$$p < .028 \quad \omega^2 = 3\%$$

(See Table #9)

Table #5

Group Means, Standard Deviations and 2 X 2 ANOVA
for Trial 1 of Completion Times

		Goal Setting		
		With	Without	
Pretesting	With	$\bar{x} = 19.52$	$\bar{x} = 25.33$	$\bar{x} = 22.66$
		$\sigma = 5.07$	$\sigma = 6.66$	$\sigma = 6.71$
	Without	$\bar{x} = 21.41$	$\bar{x} = 26.97$	$\bar{x} = 24.33$
		$\sigma = 8.11$	$\sigma = 8.20$	$\sigma = 8.69$
		$\bar{x} = 20.50$	$\bar{x} = 26.40$	
		$\sigma = 6.98$	$\sigma = 7.75$	

Bartlett's Chi-squared value = 10.15 3df $p < .02$

2 X 2 ANOVA

Source	df	Sum of Squares	Mean Squares	F	$p <$
Between	3	939.41	XXX	XXX	
Columns (Goal Setting)	1	856.92	856.92	15.82	.0001
Rows (Pretesting)	1	82.07	82.07	1.52	.221
Interaction	1	.42	.42	.01	.921
Within	103	5579.22	54.17	XXX	
Total	106	6518.63	XXX	XXX	

Strength of Association (ω^2) for Columns (Goal Setting) = 12%

Table #6

Group Means, Standard Deviations and 2 X 2 ANOVA
for Trial 2 of Completion Times

		Goal Setting		
		With	Without	
Pretesting	With	$\bar{x} = 13.48$	$\bar{x} = 18.00$	$\bar{x} = 15.92$
		$\sigma = 5.07$	$\sigma = 8.75$	$\sigma = 7.71$
	Without	$\bar{x} = 15.59$	$\bar{x} = 21.23$	$\bar{x} = 18.56$
		$\sigma = 7.52$	$\sigma = 9.23$	$\sigma = 9.00$
		$\bar{x} = 14.62$	$\bar{x} = 19.70$	
		$\sigma = 6.66$	$\sigma = 9.23$	

Bartlett's Chi-squared value = 12.42 3df $p < .01$

2 X 2 ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	882.30	XXX	XXX	
Columns (Goal Setting)	1	684.47	684.47	10.46	.0016
Rows (Pretesting)	1	189.53	189.53	2.90	.092
Interaction	1	8.30	8.30	.13	.719
Within	103	6739.62	65.43	XXX	
Total	106	7621.92	XXX	XXX	

Strength of Association (ω^2) for Columns (Goal Setting) = 8%

Table #7

Group Means, Standard Deviations and 2 X 2 ANOVA
for Trial 1 of Content Test Scores

		Goal Setting		
		With	Without	
Pretesting	With	$\bar{x} = 26.78$ $\sigma = 5.84$	$\bar{x} = 25.59$ $\sigma = 5.42$	$\bar{x} = 26.14$ $\sigma = 5.71$
	Without	$\bar{x} = 25.52$ $\sigma = 7.41$	$\bar{x} = 22.90$ $\sigma = 5.85$	$\bar{x} = 24.14$ $\sigma = 6.82$
		$\bar{x} = 26.10$ $\sigma = 6.83$	$\bar{x} = 24.18$ $\sigma = 5.86$	

Bartlett's Chi-Squared value = 6.87 3df

2 X 2 ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	213.41	XXX	XXX	
Columns (Goal Setting)	1	96.13	96.13	2.42	.123
Rows (Pretesting)	1	103.76	103.76	2.61	.109
Interaction	1	13.52	13.52	.34	.561
Within	103	4087.87	39.69	XXX	
Total	106	4301.28	XXX	XXX	

Table #8

Group Means, Standard Deviations and 2 X 2 ANOVA
for Trial 2 of Content Test Scores

		Goal Setting		
		With	Without	
Pretesting	With	$\bar{x} = 26.57$	$\bar{x} = 29.67$	$\bar{x} = 28.24$
		$\sigma = 5.98$	$\sigma = 7.18$	$\sigma = 6.90$
	Without	$\bar{x} = 29.93$	$\bar{x} = 27.73$	$\bar{x} = 28.77$
		$\sigma = 7.13$	$\sigma = 6.44$	$\sigma = 6.93$
		$\bar{x} = 28.38$	$\bar{x} = 28.65$	
		$\sigma = 6.90$	$\sigma = 6.93$	

Bartlett's Chi-Squared value = 4.90 3df

2 X 2 ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	204.73	XXX	XXX	
Columns (Goal Setting)	1	5.47	5.47	.12	.730
Rows (Pretesting)	1	13.50	13.50	.29	.591
Interaction	1	185.75	185.75	3.96	.049
Within	103	4829.37	46.89	XXX	
Total	106	5034.10	XXX	XXX	

Strength of Association (ω^2) for Interaction = 3%

Table #9

Group Means, Standard Deviations and 2 X 2 ANOVA
for Attitudinal Survey

Goal Setting

		With	Without	
Pretesting	With	$\bar{x} = 14.48$ $s = 20.76$	$\bar{x} = 16.41$ $s = 15.46$	$\bar{x} = 15.52$ $s = 18.30$
	Without	$\bar{x} = 18.44$ $s = 20.91$	$\bar{x} = 4.40$ $s = 15.46$	$\bar{x} = 11.05$ $s = 19.72$
			$\bar{x} = 16.62$ $s = 21.14$	$\bar{x} = 10.09$ $s = 16.73$

Bartlett's Chi-Squared value = 8.43 3df $p < .04$

2 X 2 ANOVA

Source	df	Sum of Squares	Mean Squares	F	p <
Between	3	3092.39	XXX	XXX	
Columns (Goal Setting)	1	972.79	972.79	2.84	.095
Rows (Pretesting)	1	428.54	428.54	1.25	.266
Interaction	1	1691.05	1691.05	4.93	.028
Within	103	35334.12	343.05	XXX	
Total	106	38426.51	XXX	XXX	

Strength of Association (ω^2) for Interaction = 3%

Homogeneity of Variance

A Bartlett's test for homogeneity of variance, a test of one of the assumptions on which ANOVA is based, was conducted for each ANOVA. In most cases the data meets the assumption of homogeneity of variance. However, this assumption was violated in the ANOVA of both trial 1 and trial 2 for the completion times and again in the analysis of the attitudinal survey. Since these are the analyses that yielded the most significant results, this violation of the homogeneity of variance assumption is a critical issue and will be dealt with more fully in the discussion of results.

Chapter 5

SUMMARY, CONCLUSIONS AND IMPLICATIONS

Discussion of Results

Before any conclusions are drawn, a discussion of the violations of the assumption of homogeneity of variance is in order. The homogeneity of variance assumption was violated in both trial 1 and 2 of the ANOVAs for completion times and also in the ANOVA for attitudes. Winer states that,

Moderate departures from this assumption (homogeneity of variance) do not, however, seriously affect the sampling distribution of resulting F statistic. That is, when the variances in the population are not equal, the F statistic using a pooled variance has approximately the same distribution as the F statistic which takes the differences into account.

Winer continues,

There is some evidence that all the tests for homogeneity of variance that have been discussed above are oversensitive to departures from normality of the distributions of the basic observations.²⁶

Bartlett's test, used to test the homogeneity of variance assumption in all the ANOVAs in this study, is the most sensitive of the tests discussed by Winer. So, the test used to test the homogeneity of variance may be overly sensitive but assuming that violations did occur, the F statistic adjusted for the difference in variances would not be greatly different from the obtained F statistic. Subsequently, the level of confidence, although smaller, would not be greatly different. In trials 1 and 2 for the completion times, with their high levels of

²⁶Winer, op. cit., pp. 205-210.

confidence ($p < .0001$ and $p < .0016$ respectively), the adjusted values would still be significant. The violation of the homogeneity of variance assumption for the attitudinal survey is much smaller ($p < .04$). So, considering the oversensitivity of the test, the adjusted F value would probably remain significant.

The shift of group variances does tend to indicate that the treatment or the lack of treatment is having a direct effect on the measure of achievement, completion time. The result of this effect is more understandable in graphic form. (See Figure #1) The group variability of completion times for Groups I and II, those experiencing goal setting, is lower and decreasing. Whereas, the group variability of the completion times for Groups III and IV, those not experiencing goal setting, is higher and increasing. This is most easily observed in the combined variances of Groups I and II compared to the combined variance of Groups III and IV. (See Figure #2) An earlier study concluded,

The assigning of specific and reasonably hard goals to these S's (low motivated) raised performance levels and favored development of more positive attitudes toward the task. On the other hand, telling the high-motivation S's to do their best (without goal setting) resulted in little performance increase and development of increasingly less favorable attitudes toward the task.²⁷

The results of this current study would seem to reflect those conclusions, although further studies would be necessary to specifically isolate the effect of goal setting on high motivated subjects versus low motivated subjects.

In any case, this study clearly demonstrates that, under the conditions of this experiment, that goal setting increases the achievement

²⁷Bryan and Locke, "Goal Setting as a Means of Increasing Motivation".

Figure #1
Group Variances vs. Trial for Completion Times

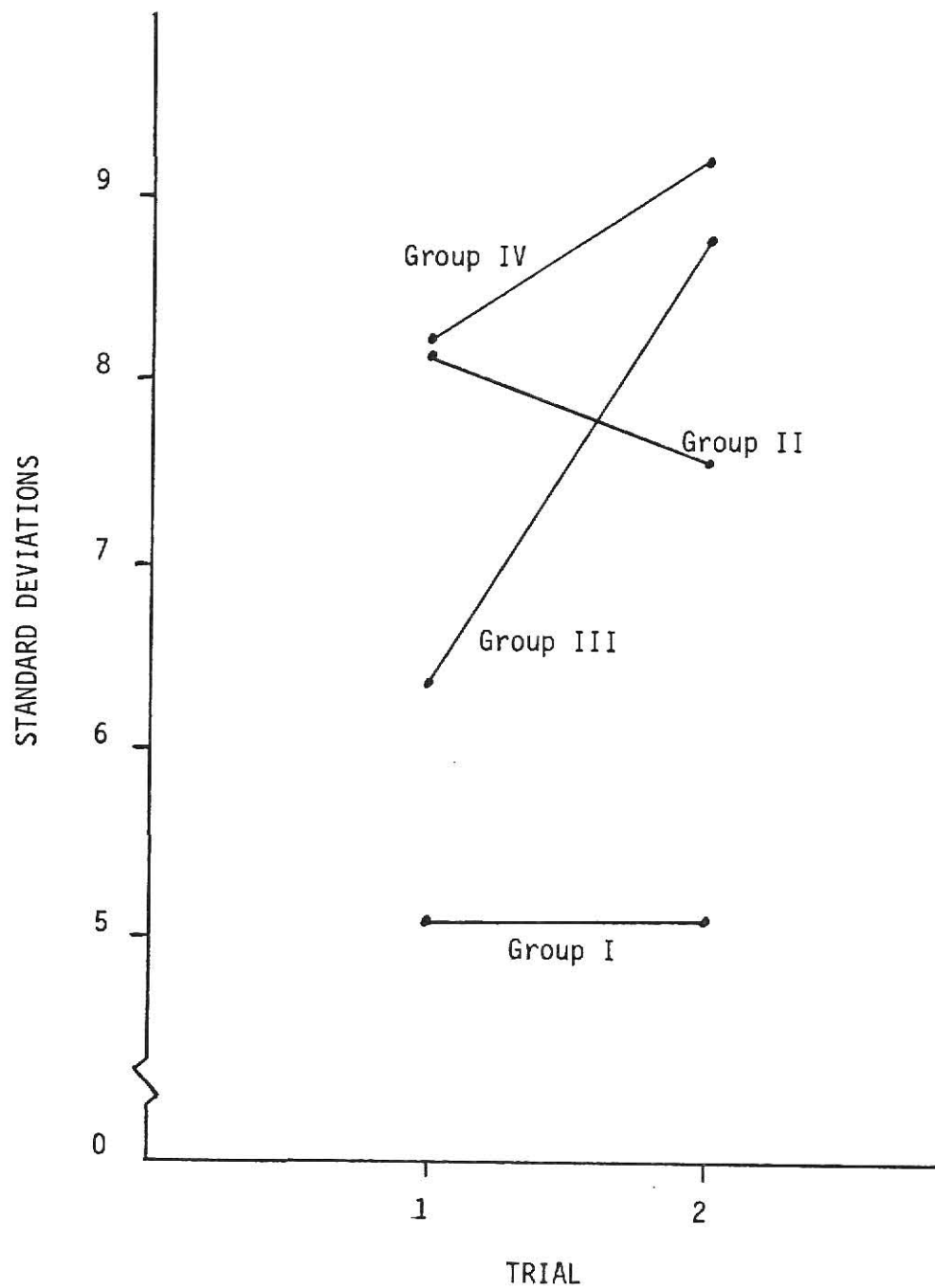
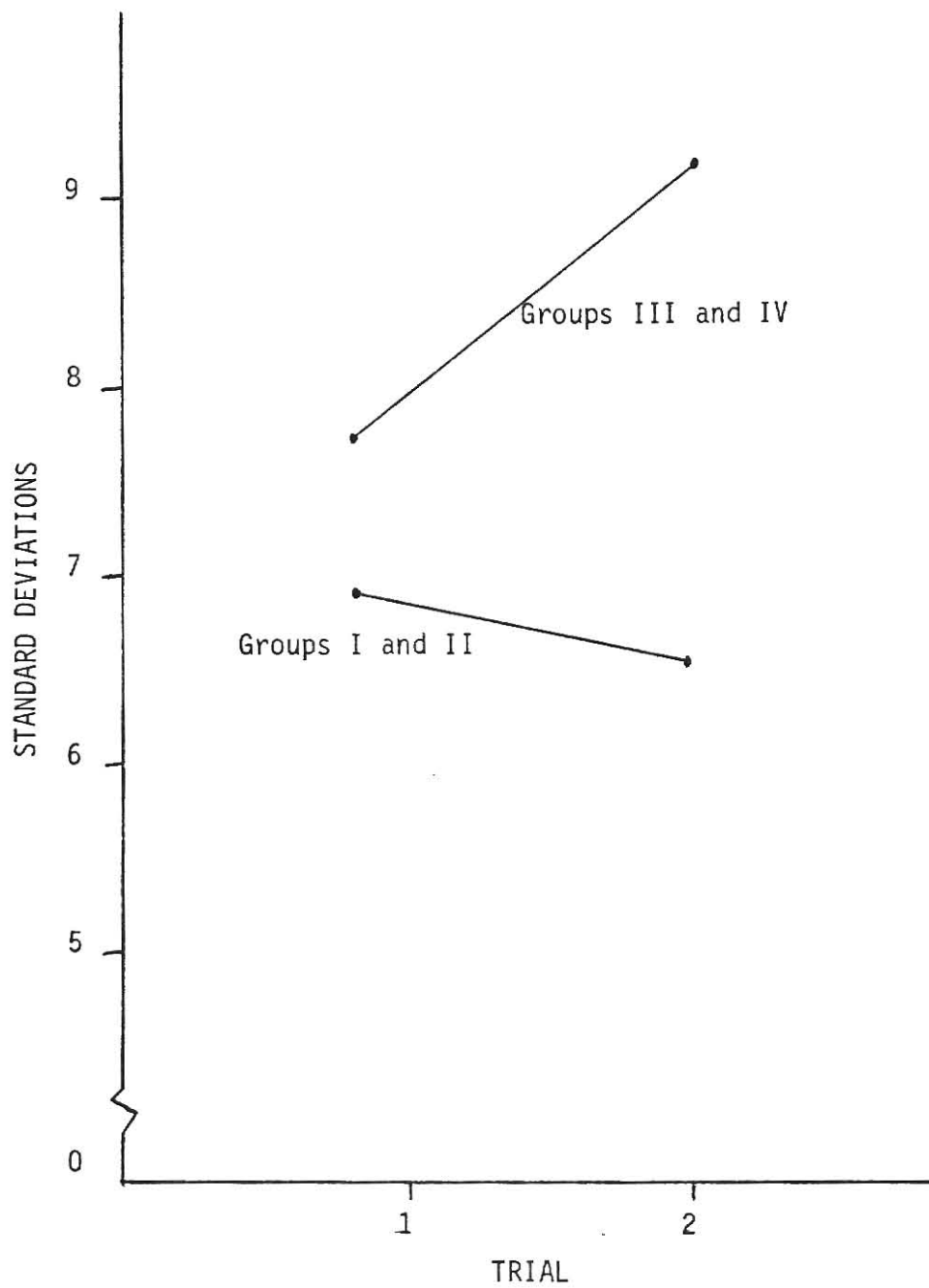


Figure #2

Combined Group Variances vs. Trial for Completion Times



levels of subjects as measured by the time required for the subjects to complete an instructional unit. In a different light, the groups that received goal setting conferences required 29% less time to complete an instructional unit in trial 1 and 35% less time in trial 2 compared to those groups that did not receive goal setting conferences. However, this study indicates that pretesting has no effect on completion times under the conditions of this study.

The evidence from this study does not, however, show that goal setting or pretesting improves the level of achievement as measured by scores on the content test used in this curriculum. On trial 2 of the ANOVA for content test scores a significant interaction between goal setting and pretesting did occur but its level of confidence and strength of association are so marginal ($p < .049$, $\omega^2 = 3\%$) that extreme caution would have to be used in attempting to generalize from this one result. Considering the evidence from previous studies on content achievement and the lack of validity and reliability data on the content tests used in this study, final judgement of the effectiveness of goal setting and pretesting in raising the performance of subjects on content tests must be reserved until instruments are developed for measuring content achievement with known validity and reliability.

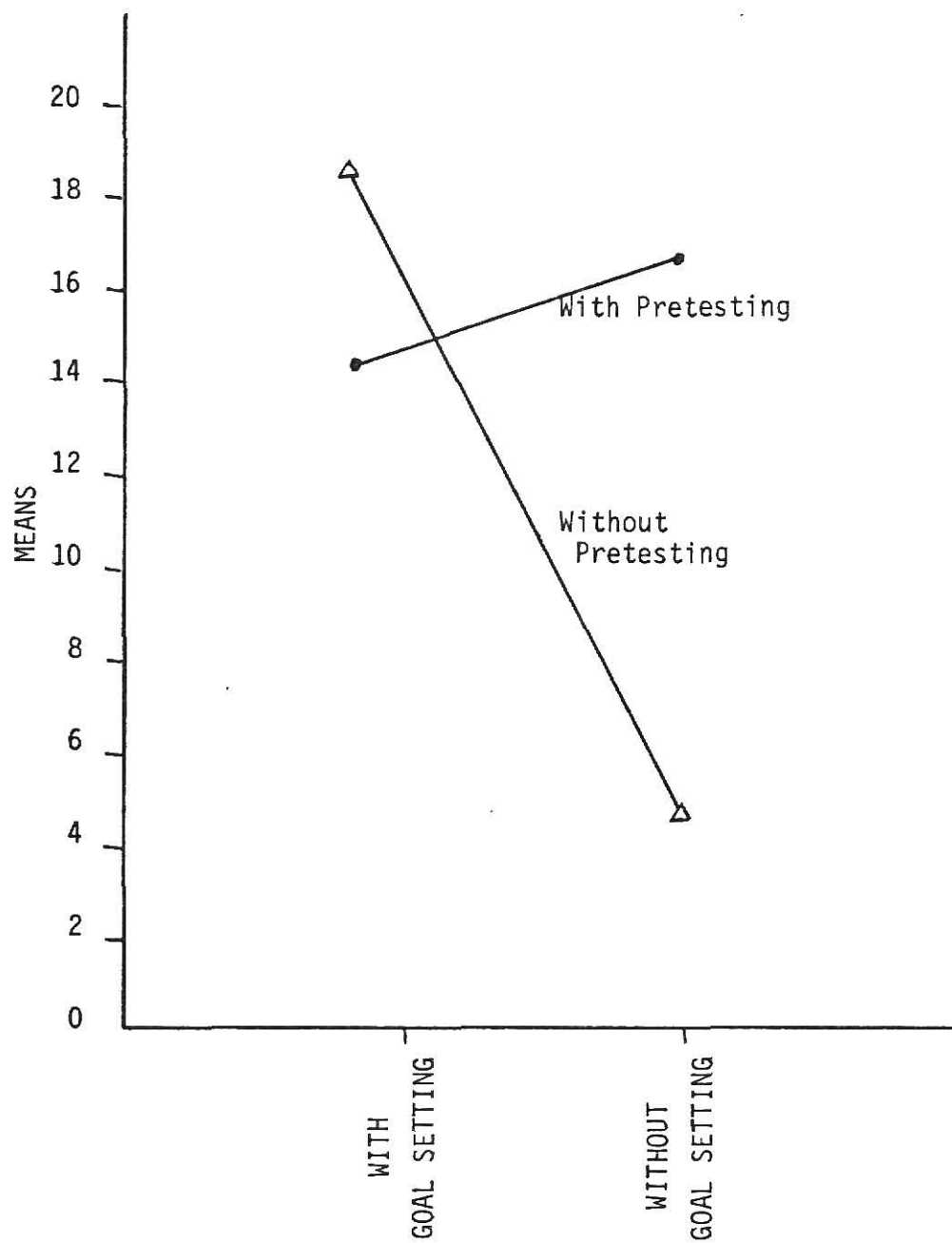
The interaction between goal setting and pretesting under the conditions of this study produced a favorable change in attitudes toward science as measured by the attitudinal survey developed for this study. However, it would appear that the majority of that favorable attitude was contributed by the goal setting procedure. (See Figure #3)

Limitations of the Study

1. This study was conducted with the author as the classroom instructor, which may lead to an experimental bias. However, care was

Figure #3

Group Means vs. Treatments for Attitude Survey



exercised to assure that administration of treatments was the only difference in the classroom procedures and collection of data.

2. Since this study was limited to one particular curriculum at one particular grade level, some caution must be exercised in generalizing from this study to other curricula and grade levels.

3. The questionable validity and reliability of the content tests used in this study make any conclusions about the effect of pretesting and goal setting on achievement, as measured by those instruments, suspect.

Implications for Further Study

1. The effects of pretesting and goal setting on content achievement needs to be clarified with further studies using instruments of known validity and reliability.

2. The role of motivation level in the effects of goal setting needs to be clarified by further study.

3. The interrelationships between attitude, achievement and motivational effects needs to be clarified by further study.

4. The type of curriculum and grade level of subjects needs to be broadened to increase the generalizability of goal setting as an effective motivational technique for increasing achievement.

Summary

1. No conclusions can be drawn from this study on the effects of goal setting and pretesting on achievement as measured by content test scores.

2. This study indicates that group goal setting conferences can provide a strong intrinsic motivation force that can be used to increase

achievement, as measured by the amount of time required for subjects to complete an instructional unit, within an individualized curriculum. In view of the fact that lack of motivation on the part of the student and poor student efficiency are two criticisms often made about individualized curricula by educational practitioners and laymen alike, then the conclusions of this study hold strong implications for the classroom teacher.

3. This study further indicates that as the students' motivation and achievement improve, that the attitude toward the subject matter and curriculum also improve.

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APPENDIX A
Attitudinal Survey and Response Sheet

WHAT IS YOUR ATTITUDE TOWARD SCIENCE?

(A Scientific Attitude Inventory)

There are some statements about science on the next few pages. Some statements are about the nature of science, some are about how scientists work. Some of these statements describe how you might feel about science. You may agree with some of the statements and you may disagree with others. That is exactly what you will be asked to do. By doing this, you will show your attitude toward science.

After you have carefully read a statement, decide whether or not you agree with it or have no opinion about it. If you agree, decide whether you agree mildly or strongly. If you disagree, decide whether you disagree mildly or strongly. Then find the number of that statement on the answer sheet, and blacken the letter:

- A. if you agree strongly.
 - B. if you agree mildly.
 - C. if you have no opinion.
 - D. if you disagree mildly.
 - E. if you disagree strongly.
-

Example:

00. I would like to have a lot of money.

00. ☒ A B C D E

(The person who marked this example agrees strongly with the statement, "I would like to have a lot of money".)

Please respond to each statement and blacken only one space for each statement.

Please do not make any marks on this test booklet.

WHAT IS YOUR ATTITUDE TOWARD SCIENCE?

1. If one scientist says a theory is true, all other scientists will believe him.
2. I would prefer that my science teacher lectured more.
3. Working in a laboratory would be an interesting way to earn a living.
4. One of the most important jobs of a scientist is to report exactly what his senses tell him.
5. I may not make many great discoveries, but working in science would still be interesting to me.
6. Scientists should not criticize each others' work.
7. I like doing experiments.
8. Scientific laws cannot be changed.
9. Most people are not able to understand the work of science.
10. I would enjoy working with other scientists in an effort to solve scientific problems.
11. I am enjoying science this year.
12. I would enjoy studying science and using this knowledge in some scientific field.
13. Scientists have to study too much and I would not want to be one for this reason.
14. Most people are able to understand the work of science.
15. I am confused about what I am supposed to be doing in class each day.
16. Scientific explanations can be made only by scientists.
17. Science is so difficult that only highly trained scientists can understand it.
18. Scientific work would be too hard for me.
19. Every citizen should understand science because we are living in an age of science.
20. A scientific theory is no better than the objective observations upon which it is based.

21. I know what I am supposed to be working on each day in science class.
22. Ideas are one of the most important products of science.
23. His senses are one of the most important tools a scientist has.
24. The day after day search for scientific knowledge would become boring to me.
25. People need to understand the nature of science because it has such a great affect upon their lives.
26. I would prefer to have more reading from a science text book than lab work.
27. Once they have developed a good theory, scientists must stick together to prevent others from saying it is wrong.
28. Science may be described as being primarily an idea generating activity.
29. I like working on my own or with a lab partner in science.
30. I do not want to be a scientist because it takes too much education.
31. The products of scientific work are mainly useful to scientists, they are not very useful to the average person.
32. I waste a lot of time in science class because I do not like science.
33. A good scientist doesn't have any ideas he is not willing to change.
34. When a scientist is shown enough evidence that one of his ideas is a poor one, he should change his idea.
35. Scientists cannot always find answers to their questions.
36. A scientist must be imaginative in developing ideas which explain natural events.
37. I would like to take science again next year.
38. I would like to work in a scientific field.
39. I would prefer that the whole class worked together in science.
40. Scientists believe that nothing is known to be true with absolute certainty.

WHAT IS YOUR ATTITUDE TOWARD SCIENCE? -- ANSWER SHEET

	Strongly Agree	Mildly Agree	No Opinion	Mildly Disagree	Strongly Disagree
1.	A	B	C	D	E
2.	A	B	C	D	E
3.	A	B	C	D	E
4.	A	B	C	D	E
5.	A	B	C	D	E
6.	A	B	C	D	E
7.	A	B	C	D	E
8.	A	B	C	D	E
9.	A	B	C	D	E
10.	A	B	C	D	E
11.	A	B	C	D	E
12.	A	B	C	D	E
13.	A	B	C	D	E
14.	A	B	C	D	E
15.	A	B	C	D	E
16.	A	B	D	D	E
17.	A	B	C	D	E
18.	A	B	C	D	E
19.	A	B	C	D	E
20.	A	B	C	D	E

	Strongly Agree	Mildly Agree	No Opinion	Mildly Disagree	Strongly Disagree
21.	A	B	C	D	E
22.	A	B	C	D	E
23.	A	B	C	D	E
24.	A	B	C	D	E
25.	A	B	C	D	E
26.	A	B	C	D	E
27.	A	B	C	D	E
28.	A	B	C	D	E
29.	A	B	C	D	E
30.	A	B	C	D	E
31.	A	B	C	D	E
32.	A	B	C	D	E
33.	A	B	C	D	E
34.	A	B	C	D	E
35.	A	B	C	D	E
36.	A	B	C	D	E
37.	A	B	C	D	E
38.	A	B	C	D	E
39.	A	B	C	D	E
40.	A	B	C	D	E

APPENDIX B
Goal Setting Sheet

GOAL SETTING SHEET

NAME _____ PERIOD _____

DATE _____

1. What module are you working on? _____

2. What chapter? _____ 3. What page? _____

4. Comparing your last week's goals with what you actually accomplished, did you (Check one)

_____ a. accomplish more than you expected?

_____ b. accomplish just about the amount of work you expected?

_____ c. accomplish less than you expected?

5. If you took a test last week, did you (Check one)

_____ a. get a higher grade than you expected?

_____ b. get about the grade you expected?

_____ c. get a lower grade than you expected?

6. Briefly explain, in complete sentences, what you plan to accomplish in science this week. Include all activities, labs, excursions and tests.

7. If you plan to take a chapter or unit test this week, what grade do you hope to get on the test? (Check one)

_____ a. 90% or above

_____ c. 79-70%

_____ b. 89-80%

_____ d. 69-60%

THE APPLICATION OF GOAL SETTING IN THE
INDIVIDUALIZED CLASSROOM

BY

WILLIAM H. GILPIN
B.S., University of Nebraska, 1969

A THESIS ABSTRACT

submitted in partial fulfillment of the
requirements for the degree

MASTER OF SCIENCE

College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1977

ABSTRACT

In this study the effects of group goal setting conferences and pretesting on achievement and attitudes are examined in a junior high science curriculum (ISCS). Achievement is measured as scores on content tests that are normally a part of the curriculum and by the time required for the subjects to complete an instructional unit.

One hundred and four 8th grade subjects were used in a Solomon Four Group experimental design. Two sets of data were collected for both test scores and completion times. Analysis was by 2 X 2 ANOVAs with Bartlett's test for homogeneity of variance and strength of association values calculated for significant F statistics.

No conclusions were drawn on the effects of pretesting and group goal setting conferences on achievement measured by the content test scores due to the questionable validity and reliability of the tests. However, the study concludes that group goal setting conferences have a major significant effect on the time required for the subjects to complete an individualized instructional unit. The interaction between goal setting and pretesting was also found to have a significant effect on attitudes. Some implications are made concerning the effects of goal setting and the lack of goal setting behavior on the motivation of the subjects.