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The Effects of an Instructional Package on Study Question Completion Skills of High School Students

Jeffery David Montgomery
Western Michigan University

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THE EFFECTS OF AN INSTRUCTIONAL PACKAGE
ON STUDY QUESTION COMPLETION SKILLS
OF HIGH SCHOOL STUDENTS

by

Jeffery David Montgomery

A Project
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Specialist in Education
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
August 1983
The purpose of this study was to empirically evaluate the effects of an instructional package on study question behaviors. The instructional package, incorporating contingent reinforcement, modeling, feedback, contingency contracting and a programmed instruction format was implemented to train four study question answering behaviors identified through task analysis. Each subject demonstrated ability to perform the four behaviors with increased accuracy on experimental measures following training. Results indicated that the instructional package was effective in training increased accuracy in each instructional behavior for each subject. Generalized performance of these behaviors in the classroom environment, assessed through comparison of classroom grades and study-question assignments prior to and following training, could not be demonstrated.
ACKNOWLEDGEMENTS

Numerous individuals have been extremely helpful throughout my educational career as well as during the course of this project. My parents and grandparents have consistently facilitated my educational pursuits through constant support and encouragement. Countless individuals I've encountered throughout my years in the Psychology department at Western have provided a stimulating environment to learn and grow. Fellow members of the 1982-83 Schoolcraft Seminar research group provided valuable insight and encouragement in the early development of this project. My committee members, Drs. Norman Peterson and Richard Malott have contributed their time and effort in providing assistance in developing my finished report. Lastly, Dr. Howard E. Farris and David B. Lennox have provided encouragement and insight during my graduate training and especially in regards to this Specialist project. In particular Dr. Farris' helpful feedback and patience through numerous drafts have allowed me to produce a final project far exceeding my abilities prior to my work with him.

Jeffery David Montgomery
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THE EFFECTS OF AN INSTRUCTIONAL PACKAGE ON STUDY QUESTION COMPLETION SKILLS OF HIGH SCHOOL STUDENTS

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Throughout the existence of Applied and Experimental Behavior Analysis researchers have made enormous contributions to the technology of modification and control of behavior. Through empirical investigation, techniques useful in producing desired behavior changes have been identified, validated, and refined. Behavior analysis researchers have identified techniques effective in modifying behaviors in a wide range of subjects and settings. Among the settings addressed by behavior analysts, educational and other learning environments have been areas of especially intensive application.

In a well known article, Bijou (1970) discussed contributions of applied behavior analysis to teaching and learning. He cited data-based analysis, acknowledgement of environmental variables, and flexibility of technology as valuable contributions to education. In response to the question of what applied behavior analysis offers education now, Bijou concluded "We can offer a set of concepts and principles derived exclusively from environmental research; we can offer a methodology for applying these principles and concepts directly to teaching practices; we can offer a research design which deals with change in the individual child (rather than inferring from group averages) and we can offer a philosophy of science which insists on observable accounts of the relationships between individual behavior and it's determining conditions" (p. 65).

Further contributions were identified by Skinner in his work titled "The Technology of Teaching" (1968). Skinner states that the experimental analysis of behavior has produced a technology of teaching
from which educators may "deduce programs and schemes and methods of
struction" (p. 27). In pointing to such educational techniques as
programmed instruction and teaching machine Skinner concluded that
numerous behavioral principles developed by researchers have been
incorporated into current methods of instruction.

The purpose of this review is to summarize information concerning
the efficiency of several commonly known behavioral procedures in
applications in the educational environment and to support inclusion
of those principles in teaching programs dealing with the development
of basic skills. The procedures are contingent reinforcement, modeling,
and feedback. Other practices examined in this review incorporate
numerous behavioral techniques and have also proven effective in
teaching academic behavior. These are programmed instruction and
contingency contracting.

Initially, reinforcement theory was presented to teachers and
utilized to eliminate inappropriate behaviors. Numerous studies
utilizing contingent reinforcement demonstrated success in eliminating
inappropriate behaviors in the classroom across behaviors and subjects
(Madsen, Becker, and Thomas, 1968; Harris and Sherman, 1973). Similarly,
this same technique has been used in numerous studies to increase
positive academic behaviors such as attending and general academic
performance (Hall, Lund, and Jackson, 1968; Ayllon and Roberts,
1974).

Another procedure frequently utilized in modifying behavior is
modeling. Modeling has been demonstrated effective in eliminating
inappropriate behaviors while maintaining appropriate behaviors
(Burgess, Burgess, and Esuelqt, 1970), increasing rates of appropriate
consequating behaviors by parents (Englen, Knutsen, Laughy, and Garglington, 1968) and teachers (Becker, Madsen, Arnold, and Thomas, 1967), as well as directly increasing rates of appropriate behaviors by students in the classroom (Johnson and Bailey, 1974).

Feedback has also been employed with great success in eliminating inappropriate behaviors as well as increasing appropriate behaviors. In assessing the effects of feedback on accuracy of quiz responses Kulhavy, Yekovich and Dyer (1979) presented a 25-frame program to 125 college undergraduates, with half receiving feedback after each frame response. Results of this study indicated that subjects receiving feedback demonstrated higher post-test recall and fewer errors. In a related study Anderson, Kulhavy and Andre (1971) found that subjects are likely to remember more about an instructional response such as answering test questions over slide information as in this study if they receive feedback following the response. Kulhavy, Yekovich and Dyer concluded that feedback decreases incorrect responding by allowing the subject to gain a clearer understanding of "thematic content relations" or critical features of positive and negative academic responses through continuous matching of responses to feedback. Additionally, Van Houten, Hill and Parsons (1975) identified feedback as a critical variable, in combination with timing of assignment completion, public posting of grades and praise, in improving academic performance.

Contingency contracting incorporates several behavioral procedures including reinforcement and feedback. Secondly, contracting allows for inclusion of many critical components of instruction including criteria, consistency and small steps. An early paper identified the
contracting procedure as a potentially powerful technique for educators dealing with problem behaviors of children (Cantrell, R.P., Cantrell, M., Huddleston and Woolridge, 1969). More recent studies have utilized this procedure to increase study rate and test performance of high school students and undergraduate psychology students (Farris and Redmon, 1982; Bristol and Sloane, 1974), significantly increase reading scores of seventh grade students (Schwartz, 1977) and increase on-task and assignment completion while decreasing disruptive behaviors in sixth grade students (White-Blackburn, Semb, S. and Semb, G.S., 1977).

Programmed Instruction also incorporates a number of behavioral principles such as modeling, feedback and praise. Programmed instruction also allows for the inclusion of critical components of effective instruction including criteria, consistency and massed learning trials. This procedure was advocated by Skinner (1968) and has been demonstrated to be an effective educational tool with a wide range of populations (Keller, 1968; Brigham, Finfrock, Bruenig and Bushell, 1972). A further benefit of the programmed instruction approach relates to a decrease on the teacher behavior necessary to provide instruction (Skinner, 1968).

While numerous authors have addressed the issue of study skills and the retention of information, the wide range of variables and perspectives clearly illustrates a lack of agreement among educational researchers regarding effective procedures for information retention. In addressing the issue of study skills various "study type" behaviors have been placed into "classes" and identified as components of study behavior. This has resulted in a large number of overlapping and
poorly defined behaviors. Concept attainment and information processing are two such groups of behaviors frequently identified as components of study behavior though researchers are unable to agree whether or not these behavior classes are relatively distinct (Lemke, Harris and Klausmeier, 1967; Hovland, 1952; Hunt, 1962) behaviors. Similarly, researchers have been unable to agree upon effective techniques in programming to increase retention.

Webb and Schwartz (1959) examined the relationship between amounts of material and level of recall and concluded that as the amount of information increased, accuracy in answering a related question decreased significantly. Numerous authors have approached the area of information retention by analyzing the effects of specific study strategies in facilitating it. Gagne and Wiegand (1970) compared the differential effects of presenting facts in a context containing a super-ordinate (topic statement) versus a related statement not identifying the topic of the passage. In their study forty-four fourth graders were given five facts to learn and remember, half were presented the facts with a topic statement and the other half were presented the facts with a related statement which did not identify the topic of information. Subjects in the group presented with the topic statement demonstrated increased recognition of facts, recall of facts, and recognition of context facts appearing to indicate that the context in which information is presented is a factor in recall. In a similar study Ausubels (1960) investigated the effects of introductory written passages in learning and retention of verbal material. A group of senior undergraduates at the University of Illinois were presented with a 2500 word passage of a generally unfamiliar nature.
Half of the undergraduates were presented with introductory written passages designed to serve as an organizational focus for passage information. Results of a multiple-choice test over information contained in the experimental passage indicated that those students presented with introductory passage summarizing topic matter of the text passage were significantly more accurate on the test than those subjects not receiving an introductory written passage prior to the tested passage.

Other researchers have attempted to teach students study strategies. Alessi (1979) demonstrated that a strategy to perform addition problems could be taught to later elementary school children with significant increase in rate of correct calculation of addition problems. Similarly Larkin and Reif (1976) taught a group of students a skill for acquiring information from a physics text. This skill was trained and resulted in increased rate of acquisition for the subjects in comparison to a control group, with subjects exhibiting the strategy for up to two weeks unprompted. An equally important observation of these researchers was that many subjects appeared lacking effective study strategies prior to training as demonstrated by their inability to obtain critical information from text passages prior to instruction.

The results of research on the topic seem to indicate that a majority of students exhibit few strategies for studying and learning. While Hall, Lund and Jackson (1968) found that contingent teacher attention could be used to increase study behaviors, no new behaviors were taught in the study which involved behaviors already within the subjects' repertoire. Gengler (1965) found that later elementary school students do not exhibit strategies for many lower level academic
skills such as locating information within passages. Carnine and Silbert (1979) in reviewing traditional curriculum found that many prerequisite academic skills are left out of instruction. These authors have developed a teaching and learning strategy called Direct Instruction which emphasizes the introduction and training of sub-skills prior to introducing complex academic tasks. In concluding that study skills will not be obtained by some students unless direct and systematic instruction occurs Carnine and Silbert refer to Brown (1976) who suggested that many students discover learning strategies without explicit instruction, however "instructionally naive" students do not. "Instructionally naive" is a term developed by the direct instruction authors and refers to students who for any of a variety of reasons, including excessive absences, poor instruction, sensory impairment or non-stimulating home environment have missed out on instruction. These students are also deficit in component behaviors of complex academic skills.

Study question assignments over large passages of reading material have become a popular method of instruction, often in conjunction with a programmed instruction format. These assignments require students to answer questions, often developed by the teacher, dealing with especially important information contained within assigned passages. In reviewing programmed systems of instruction, Lloyd (1977) hypothesized that study guides may be a critical independent variable in increased efficiency of programmed instruction compared to traditional lecture-oriented instruction. Numerous authors have analyzed the effects of study questions on academic performance. Semb, Hopkins and Jursh (1973) concluded that performance increased
on criterion tests as a function of relevant information being included in study questions. Similarly Rothkopf and Bisbicos (1967) tested the hypothesis that study questions following passages was the optimal procedure for retention of passage information. In this study 252 high school students were presented with a 36 page passage with two questions for every three pages. Results indicated that subjects presented with the questions following the passages performed at a higher level of accuracy on a post training retention test than subjects presented with study questions prior to presentation of passage information. These results supported the hypothesis that study questions following passages facilitated learning of several categories of text content. In a related study Semb (1975) analyzed the effects of unit tests on student performance on final exams. No significant differences were seen between those subjects presented with unit tests and those not taking the tests when both were presented with study guides appearing to indicate that study guides are a worthwhile activity regardless of other classroom instructional techniques.

Additional support for the use of study guides in the classroom was provided by Farnum and Brigham (1978) who evaluated the use of study guides with middle school students. Twenty-four fifth grade students were exposed to either quizzes with study guide condition or quizzes without study guide condition. Results indicated that students who received study guides always scored higher in a social studies test than those not receiving study guides. Results of other studies have further supported the notion that study guides are an effective educational tool (Frase, 1967).
While the literature on effects of study questions is substantial, research concerning training of study question completion is non-existent. Total lack of instruction in these skills in traditional curriculum is consistent with the previously presented findings of Carnine and Silbert. This study will attempt to train four behaviors related to study question completion identified through task-analysis (Mager, 1972). The training package will incorporate behavioral techniques including contingent reinforcement, modeling, feedback, contingency contracting and a programmed instruction format and will be evaluated for effectiveness in training these specific study behaviors.
METHOD

Subjects and Setting

The subjects of this study were three ninth grade male students from a public high school. All three subjects were enrolled in a Michigan history class in the Fall and Winter of 1982-83. Subjects were chosen to participate based on teacher reports of inability to complete study-question homework assignments. All subjects were receiving below average grades prior to participation in this study.

Each subject was taught by the same Michigan history instructor. Subjects 2 and 3 were in the same class and Subject 1 was in a section taught another hour. The same text was used in both sections, the same information was covered at approximately equal rates and the class format was identical for both hours. All subjects were enrolled in a study hall for one hour a day, five days a week. All research activities were conducted during study hall sessions. After Baseline testing was conducted in the study hall classroom, remaining experimental sessions were conducted in a small room off the school library. The room had adequate lighting and contained three chairs and a table.

Materials

The textbook utilized in both class sections was Michigan Yesterday and Today by Ferris E. Lewis. Text information included in study activities involved chapters 3 through 11. Each instructional unit involved completion of a worksheet of thirteen study questions similar to those assigned by the teacher for test review activities. The
chapter which contained information to answer the question was identified for each question. All questions were answerable with information directly out of the indicated chapter. The same worksheet was used for each instructional unit.

Experimental measures administered consisted of paper and pencil five question measures presented to each subject three times prior to training, and prior to and following completion of each instructional unit. The questions were also similar to those assigned in the classroom. The relevant chapter was identified for each question.

Procedure

This study was initiated in the middle of the fall semester of 1982 and was completed in January of 1983 for a total of ten school weeks. Each instructional unit lasted one or two sessions, with each session lasting from 35 minutes to a full hour.

Contract Condition

For the first three experimental measures, a contingency contract was in effect. The "contract phase" was implemented to determine whether non-completion of study question assignments was due to lack of motivational contingencies or skill deficits. The contract specified a mutually agreed upon activity contingent on correct completion of each instructional behavior on each of the five questions.

Dependent Variables

Behaviors trained in this project included responses of circling key words of the question, writing a sentence composed of the circled
key words, listing the page and paragraph number of the paragraph that answers the question and listing page and paragraph numbers of support paragraphs.

**Independent Variables**

Each instructional unit involved a worksheet with thirteen questions. The worksheet was completed by performing the behavior trained in that unit correctly for each question. Behavioral techniques incorporated into worksheet activities included modeling, feedback, and contingent reinforcement in the form of verbal praise.

The experimenter initiated instructional unit one by presenting the worksheet to the subject. The skill trained in instructional unit one was circling key words (names, places, dates, etc.) as well as the query (What _____, or Why _____, etc.) of each question. Key words consisted of all words which provided information concerning information necessary to answer the questions. The worksheet was presented to the subject with the key words of the first two questions already circled. The experimenter then modeled circling the key words for the third question and instructed the subject to do the same for the remaining ten questions. Feedback was provided after completion of each question consisting of descriptive praise for correct responses and that the response was incorrect and should be redone following incorrect responses. This procedure was followed for each question completed. After completion of the worksheet by the subject the examiner again tested with experimental measures identical to those presented prior to instruction.

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Following a steady rate of correct responding for behaviors one and two on post instruction measures, instructional unit two was initiated. Unit two trained writing a sentence composed of the key words circled in instructional unit one. The subject was presented with the worksheet utilized in instructional unit one. The subject had circled the key words of each question during instructional unit one activities. Modifications for unit two involved the experimenter writing "key words sentences" for the first two questions before presenting them to the subjects. These key words sentences were made up of the key words identified and circled for each question during instructional unit one. After presenting the worksheet to the subject the experimenter modeled correct "key words sentence" writing for the third question, then instructed the subject to perform this behavior for the ten remaining questions, providing feedback after completion of each question. Again correct responses were descriptively praised, incorrect responses were identified and subjects were required to redo the question correctly. After each question was completed correctly the experimenter instructed the subject to complete the remaining questions. Following instructional activities, the experimenter presented each subject with five question experimental measures and instructions to complete it.

Once a steady rate of responding for behaviors two and three on experimental measures was achieved, instructional unit three was initiated. This unit taught identification of paragraphs containing the information necessary to answer the study question. The subject was required to write the page and paragraph number of paragraphs meeting this criteria. The same procedure used in previous units was
followed for all remaining instructional tasks. The unit involved the same worksheet. The experimenter modeled the appropriate technique by reading the first sentence of each sentence out loud, then stating either "yes this sentence appears to be related to the study question" and reading the remainder of the paragraph closely or if the first sentence did not appear to be related to the question state so and go on to the next first sentence. This procedure was repeated until the question answering paragraph was identified. Then the experimenter demonstrated how to write the page and paragraph number for the proper paragraph. Once again, following completion of the instructional unit the subject was instructed to demonstrate the four behaviors on a five-question measure.

When steady rates of responding for behaviors three and four were achieved, instructional unit four training identification of paragraphs related to the key words of the question was initiated. The experimenter incorporated modeling of the paragraph scanning technique identical to the previous instructional unit. Following modeling, the subject was required to write the page and paragraph numbers of paragraphs containing information related to any of the key words. Again five question paper and pencil experimental measures were administered to the subjects until steady rates of responding were achieved for each instructional behavior.

Classroom performance as measured through of study question assignments turned into the classroom teacher was assessed in the present study. Student question assignments were requested for each subject both prior to and following instruction. These assignments were graded by the classroom teacher for completeness and accuracy.
Classroom performance as measured by overall class grades was observed prior to and following instructional activities to further determine whether generalization to classroom assignments occurred. A lack of sensitivity of class grades is acknowledged by the experimenter and is therefore included only as a supplementary measure.
Table 1. Outline of experimental procedure.
Table 1. Outline of experimental procedure

I. Presentation of three identical experimental measures under contract conditions.

II. Administration of non-contracted, fourth experimental measures.

III. Implementation of Instructional Unit 1 worksheet activities.

IV. Administration of experimental measures until steady rates of correct responding achieved for all subjects over behavior one.

V. Implementation of Instructional Unit 2 worksheet activities.

VI. Administration of experimental measures until steady rates of correct responding achieved for all subjects over behavior two.

VII. Implementation of Instructional Unit 3 worksheet activities.

VIII. Administration of experimental measures until steady rates of correct responding achieved for all subjects over behavior three.

IX. Implementation of Instructional Unit 4 worksheet activities.

X. Administration of experimental measures until steady rates of correct responding achieved for all subjects over behavior four.
RESULTS

Figures 1, 2 and 3 show the rate of correct responding for each subject over the four instructional behaviors. Table 1 depicts the mean rate of correct responding prior to and following training across subjects on each instructional behavior.

Figures 1, 2 and 3 show that on four paper and pencil pre-training measures over behavior one (circling of key words such as names, dates, places and events) subject one had on the average one question correct, subject two and three had 1.25 mean questions correctly answered, each out of a possible five. On ten post-training measures subject one had 4.8 mean questions correct, subject two had 4.9 mean correct and subject three had 4.6 mean correct, again out of a possible five. These scores indicated a mean increase across subjects following training of behavior one of 3.63 mean questions correctly answered, from a group mean of 1.17 questions correctly answered over four pre-training measures to 4.8 mean questions correctly answered over ten post-training measures for each subject.

Scores from pre-training measures over Behavior Two (writing a sentence which contained all of the key words of the question) indicated subject one had a mean of 2.5 questions correct, subject two had one mean correct and subject three had 1.7 mean correct, again out of a possible five. On eight post-training measures of the same behavior subject one had 4.75 mean correct, subject two had 4.625 mean correct questions and subject three had 3.75 mean correct, all out of a possible five. These scores show a mean improvement across subjects following training of 2.6 mean correct, from a group mean of 1.73 question correct prior to instruction to 4.33 mean correct following presentation of instruction.

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Figure 1. Rate of correct response for circling key words of the question, writing a topic statement composed of key words, identifying paragraphs answering the study question, and identifying support paragraphs for Subject One.
Figure 1.

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Figure 2. Rate of correct responses for circling key words of the question, writing a topic statement composed of key words, identifying paragraphs answering the study question, and identifying support paragraphs for Subject Two.
Figure 2.
Figure 3. Rate of correct responses for circling key words of the question, writing a topic statement composed of key words, identifying paragraphs answering the study question, and identifying support paragraphs for Subject Three.
Figure 3.
Table 2. Mean rate of correct responses for circling key words of the question, writing a topic statement composed of key words, identifying paragraphs answering the study question, and identifying support paragraphs across Subjects.
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Mean correct on eight experimental measures of behavior three (identification of study question answering paragraphs) administered prior to training for subject one was 1.25 and 1.0 for subject two and .125 for subject three, each out of a possible five. On six similar experimental measures administered following completion of Instructional Unit Three subject one had 4.83 correct, subject two had 4.16 correct and subject three had 4.0 correct, again out of a possible five. These scores indicated a mean improvement across subjects of 3.54 study questions correctly answered for behavior three, from a group mean of .79 study questions correct prior to training to 4.33 study questions correct over six post-training measures administered to each subject.

Prior to training of behavior four (listing support paragraphs) subject one had .7, subject two had .5 and subject three had 0 mean correct, each out of a possible five correct responses on experimental measures. On four similar post-training experimental measures subject one had 4.75 correct, subject two had 3, and subject three had 3.0 mean correct, again out of a possible five. These scores indicated a mean increase of 3.18 mean study questions correctly answered across subjects, from a pre-training level of .4 to 3.58 mean correct following training.

Subject one's greatest increase in correct responding following training occurred over behavior four, identifying support paragraphs. Subject one obtained a mean increase following training on behavior of 4.05 from .7 mean correct over ten pre-training measures to 4.75 mean correct over four post-training measures. The smallest increase
in correct responding following training for subject one occurred over behavior two, writing a sentence containing all key words. Subject one obtained a mean increase following training over this behavior of 2.25 from 2.5 mean correct over six measures prior to training to 4.75 mean correct over eight post-training measures. Subject one also obtained a mean increase in correct responding of 3.8 on behavior one and 3.58 on behavior three. Subject one obtained a mean correct responding increase across all behaviors of 3.42.

Subject two obtained the greatest increase in correct responding following training over behavior one. Subject two obtained an increase in questions answered correctly following training of behavior one, identifying and circling key words of the question, of 3.65 mean correct from 1.25 mean correct over four pre-training measures to 4.9 mean correct over ten post-training measures. The smallest increase in correct responding following training for subject two occurred over behavior four, identification of support paragraphs. Subject two obtained a mean increase following training of 2.5, from .5 mean correct over ten pre-training measures to 3 mean correct over four post-training measures. On behaviors two and three subject two demonstrated a mean increase in correct responding following training of 3.625 and 3.16 respectively. Subject two obtained an average increase following training across all behaviors of 3.23 mean correct.

Subject three obtained the greatest increase in correct responding following training over behavior four, identifying support paragraphs. Subject three had a mean increase following training of behavior four of 3.0 mean questions correctly completed, from 0 mean correct over ten pre-training measures to 3.0 mean correct over four post-training
measures. Subject three obtained the smallest increase in correct responding following training on behavior two of 2.05 mean correct from 1.7 mean correct study questions over six pre-training measures to 3.75 mean correct study questions over eight post-training measures. Subject three obtained a mean increase following training in correct responding of 3.35 for behavior one and 3.875 for behavior three. Following training subject three obtained a mean improvement of 3.07 mean correct responses across all four behaviors.

Resulting data indicated that the contingency contract in effect for each subject for the first three experimental measures had no significant effect on subject accuracy for any of the four instructional behaviors.

Results of measures administered prior to and following each instructional unit indicated increases in accuracy of instructional behaviors were obtained for all subjects following training. The greatest increase in correct responding across subjects following training occurred on behavior one with a mean increase in correct responding across subjects of 3.53. The second largest increase in correct responding occurred on behavior three in which a 3.48 group increase in correct responding following training was recorded. The next largest increase in correct responding across subjects occurred on behavior four with pre- and post-training measures indicating a 3.43 increase in correct responding. The smallest increase in correct responding following training occurred over behavior two. Results indicated an increase of 2.6 across subjects for behavior two.

Classroom grades, prior to and following implementation of this project, were compared to identify any effects of this project which
may have generalized to the classroom setting. The subjects were graded in the classroom on a traditional scale in which an A stood for excellent, a B stood for good, a C stood for average, a D stood for poor and an E stood for failure. No improvement in teacher rating of students' overall classroom performance, as indicated by marking period grade, was observed for any of the subjects. Subject one and three obtained the same grade for both the marking period prior to and following implementation of this project (C). Subject two obtained a lower grade following training (D) than prior to implementation of the project (C).

In order to further assess generalization effects, study question assignments were requested for each subject completed prior to and following implementation of the instructional package. These assignments had been graded by the classroom teacher for accuracy and completeness. Each subject demonstrated deficits in accuracy of instructional behaviors on pre-training experimental measures, with no subject receiving more than 3 questions correctly answered out of a possible ten prior to training. Subjects one and three failed to turn in study question assignments to the experimenter following training. Subject two had turned in a study question assignment completed following training which had been given a grade score of 10, indicating each question was answered correctly.
DISCUSSION

The results of this study indicated that worksheet activities incorporating modeling, instructions, and feedback were effective in training study question completion skills. Four behaviors related to study question completion demonstrated lacking in subjects repertoire in Baseline testing were taught and the results indicated that subjects performed the behaviors at a significantly increased level of accuracy following training.

Results demonstrated an increase in response accuracy for each of the four instructional behaviors for each on experimental measures following training. Each subject varied in terms of the behavior demonstrating greatest as well as least gains. It appears that the instructional program was successful in increasing by significant amounts subjects' rate of accuracy for each of the four behaviors trained on experimental measures.

Generalization to the classroom, as measured through classroom grades prior to and following training, could not be demonstrated. Subjects 1 and 3 continued to receive a C following training while Subject 2 went from a C prior to training to a D following training. Due to the imprecise nature of a measure such as overall classroom grades, study question assignments completed by the subjects prior to and following training were compared to further assess any generalization effects to classroom study question activities. While subjects 1 and 3 failed to provide the experimenter with study question assignments completed following instruction, subject two supplied the experimenter with study question assignments completed prior to and following
implementation of this instructional package. While the study question assignment completed by subject two prior to training was graded by the classroom teacher as having only three of the ten questions accurately and completely answered, teacher rating of study question assignment completed following training indicated that all ten questions were accurately and thoroughly answered by the subject. This indicator of higher accuracy of study question completion following training is in contrast to the lower overall classroom performance rating by the classroom teacher as indicated by class grade and assigned the student the semester following presentation of the instructional package.

Each subject performed the instructional behaviors at a low rate of accuracy prior to training both on in-class assignments and experimental measures. These pre-training deficits are consistent with the findings of numerous studies, including Gengler (1965) who found that many later elementary school students do not possess strategies for many lower level academic tasks. Similarly, results obtained by Brown (1976) indicated that while many students discover learning strategies without explicit instructions, a group of students who Brown refers to as "instructionally naive" will require systematic instruction on these academic sub-skills. Additionally, Carnine and Silbert (1979) found that basic study skills and academic behaviors, such as study question completion skills, are left out of many traditional curricula. The identification of pretraining deficits in each of the subjects appears to indicate that these subjects required systematic instruction to obtain a strategy for study guide completion.

This project was designed to further the findings of numerous researchers indicating that study question activities facilitate
academic performance. As noted earlier, numerous other studies have demonstrated that study guides aid retention of information (Semb, Hopkins & Hursh, 1973), are effective in combination with differing instructional formats (Semb, 1975) and that the use of restricted categories of questions, when presented within written instructional material facilitated learning of restricted categories of text content (Rothkopf and Bsibicos, 1967). Additional support for the value of study guides in learning was provided by the findings of Farnum and Brigham (1978) who evaluated the use of study guides with middle school students. Results of this study indicated that students provided with study questions scored significantly higher on tests over related material than those students not provided with study questions. In the absence of empirical evidence of effective techniques to train study question completion skills, behavioral techniques demonstrated effective in training a wide range of academic behaviors were incorporated into the instructional package of the present study.

A contingency contract phase, incorporated into the instructional package, was in effect for the first three Baseline measures. This condition was incorporated in order to determine whether non-completion of study question assignments was due to skill deficits or simply a lack of motivating contingencies. This strategy has been demonstrated to be an effective means of increasing correct responding by providing contingencies to support correct responding. Lack of effect on subjects' accuracy on instructional behaviors during the contract phase appears to indicate that a lack of motivating contingencies were not responsible for subjects' inability to perform instructional behaviors accurately prior to training.
Additionally, feedback and modeling were incorporated in the instructional program. Feedback has been cited by one author (Lloyd, 1977) as being an important characteristic in the increased effectiveness of a programmed instruction format compared to traditional, lecture-oriented academic formats. Feedback was also demonstrated to be effective in training a wide range of behaviors in a wide range of settings (Kulhavy, Yekovich & Dyer, 1979; Anderson, Kulhsvy and Andre, 1971). Further studies have demonstrated feedback to be an effective instructional technique in combination with other procedures (Van Houten, Hill, and Parsons, 1975). Modeling was also included in the instructional package. Again, the effectiveness of modeling as a teaching procedure has been reported in numerous research articles involving a wide range of behaviors (Becker, Madsen, Arnold and Thomas, 1967; Englen, Knutsen, Laughy and Garglington, 1968; Burgess, Burgess and Esuelqt, 1970). Both modeling and feedback appear to have been effective components of instruction increasing accuracy of instructional behaviors for all three subjects.

Additional procedures employed in the instructional package included contingent reinforcement in the form of praise immediately following each correct instructional response and worksheet activities similar to a programmed instruction format. Both contingent reinforcement (Harris and Sherman, 1973) and Programmed Instruction (Keller, 1968) have a long history of effective use in educational settings, and their inclusion is further supported by improvement in subjects' response accuracy on instructional behaviors following training.

The previously reported results of significant increases in correct responding on experimental measures appear to indicate that
the package was effective in teaching the instructional behaviors. These results appear to validate the use of these principles, demonstrated effective in teaching a wide range of academic skills, in teaching behaviors related to study question completion.

In reviewing this project for future research efforts, several modifications of the procedure employed in this project should be considered. The experimental measures utilized in the present study consisted of only five questions (see Appendix 1). The limited number of questions presented to the subject may have acted as a ceiling effect on increases in questions completed correctly. Unlimited questions would eliminate any ceiling effects and may shift the focus of training towards increasing subjects' rate of accurate study question completion.

Another area which should be more extensively pursued in future research involves the contracting phase. A contract was in effect for each subject for three baseline measures. While contracting contingencies appeared to have no effect on baseline performance across subjects and behaviors, this may in part be due to the limited duration of the contract phase. While Harris and Sherman (1974) found that contingency contracts resulted in increased quality, quantity, and accuracy of homework assignments, results of the present study indicated that the contract phase had no observable effect on accuracy of instructional responses. The limited measures for which this contract was in effect (3) may be responsible for it's lack of effect on the subjects' accuracy of responding on experimental measures.

Undoubtedly the most critical issue for future research on this topic must address the issue of generalization of instructional
behaviors to actual classroom study question activities. No generalization of the instructional behaviors in this study could be demonstrated with certainty although subject 2 did demonstrate the ability to complete study question classroom assignments accurately after training following inability to do so prior to training. Identification of principles promoting generalization of instructional behaviors to the classroom would be of great value. Strategies to facilitate generalization of instructional behaviors should be tested in future related research.

This study was an attempt to teach four component behaviors related to the complex academic task of study question completion. This was an initial attempt to determine the effectiveness of an instructional package to train study question completion incorporated contingent reinforcement, feedback, and modeling as well as contingency contracting and a programmed instruction format. The package was designed to provide systematic instruction over these academic skills while requiring limited teacher behavior to implement instruction. Results of this as well as numerous other studies indicating student deficits in component behaviors of complex academic tasks support attempts to identify effective procedures to systematically train these and related academic skills not addressed in traditional curriculum.
Appendix A - Experimental measure

1. What leading counties for production of cherries are located in the region around Traverse City known as the "Nation's Cherry Bowl"?
   c. 
   d. 

2. Why was the mining of copper in the upper peninsula so hard and costly?
   c. 
   d. 

3. What did the large homes built in Detroit in the pre-1900's era look like?
   c. 
   d. 

4. For what specific purposes were steam engines being used by the 1830's?
   c. 
   d. 

5. What two types of lumber were responsible for making boat building a major industry in early Michigan?
   c. 
   d.
Appendix B - Instructional unit worksheet

1. What type of mineral deposits were discovered in the year 1848 in the upper peninsula?
   Answer Page 283 paragraph 2. Support Page 284 paragraph 1 and 2.

2. Where were American troops sent in 1796?
   Answer Page 130 paragraph 2. No support paragraphs.

3. By the year 1830 what was the main street of Detroit?

4. Why was America known as the land of opportunity for the immigrants?

5. What is the process of beneficitation in the mining industry?

6. What was the ethnic group from which the first settlers of Michigan came?

7. What has the upper peninsula provided for the United States in the last 100 years?

8. When were the Coho Salmon originally planted in Michigan rivers?

9. What effects did deforestation have on the land?

10. Who were the four local governors sent into the Lake Region by the Quebec Act of 1774?

11. What happened to the white pine and Norway pine by the year 1907?
12. During what period of years did bicycles first become common?

13. What did the term melting pot have to do with the different nationalities of immigrants and marriage?
BIBLIOGRAPHY


Schwartz, G. J. College students as contingency managers for adolescents in a program to develop reading skills. *Journal of Applied Behavior Analysis, 1977, 10*, 645-655.


