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A COMPARISON OF THE EFFECTS OF USING
VARIOUS TYPES OF WORKSHEETS ON
PUPIL OUTCOMES

by
Doris Lorraine Redfield

A Dissertation Submitted to the Faculty of the
DEPARTMENT OF EDUCATIONAL PSYCHOLOGY
In Partial Fulfillment of the Requirements
For the Degree of
DOCTOR OF PHILOSOPHY
In the Graduate College
THE UNIVERSITY OF ARIZONA

1980

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As members of the Final Examination Committee, we certify that we have read the dissertation prepared by Doris Lorraine Redfield entitled A COMPARISON OF THE EFFECTS OF USING VARIOUS TYPES OF WORKSHEETS ON PUPIL OUTCOMES and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

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Dana L. Redfield
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ABSTRACT

The primary purpose of this study was to measure differences in student achievement as a result of using different types of worksheets. The worksheets were designed to incite different ways of processing textual information. Students across five randomly selected fifth-grade classrooms were divided into three equal levels on the basis of reading achievement scores. Within levels, students were randomly assigned to treatments, consisting of different types of worksheets.

The treatment was conducted for three days and consisted of students completing one of three different kinds of worksheets following teacher reading of a lesson from the social studies textbook. The types of worksheets included: (1) "drill" designed to elicit recall or recognition of factual information, (2) "comprehension" designed to promote understanding of concepts, and (3) "structuring" requiring students to select main ideas from the textual material.

The dependent variables included: (1) an achievement posttest, (2) a follow-up achievement test administered four weeks following treatment, (3) engaged learning time (ELT), (4) allocated learning time, and (5) measures of student attitude toward the worksheets. The posttest consisted of equal numbers of items in four categories: (1) recall or recognition items identical or similar to questions asked on the "drill" worksheets (RN subscale), (2) items calling for recall or recognition of factual information not included on any of the worksheets (RI subscale),
(3) comprehension items similar to those on the comprehension worksheets (CN subscale), and (4) comprehension items reflecting material not included on any of the worksheets (CI subscale). The follow-up achievement measure consisted of five items from each of the categories used for the posttest divided into recognition and recall (R) and comprehension (C) subscales.

In terms of student achievement, the results indicated:

1. No significant differences were found among treatment groups on the posttest.
2. High and middle ability readers performed better than low ability readers on the posttest ($p < .01$).
3. Across students, performance was highest for the RN subscale of the posttest ($p < .01$). Students also performed better on the RI and CN subscales than on the CI subscale ($p < .01$).
4. Regardless of treatment, high and middle ability readers outperformed low ability readers on the R subscale of the follow-up test ($p < .01$).
5. High ability readers in the drill and comprehension groups performed significantly better than low ability readers in the drill and comprehension groups on the C subscale of the follow-up test ($p < .05$).

Examination of the time variables revealed that:

1. Students in the structuring group alloted more time to task completion than students in the drill or comprehension groups ($p < .01$).
2. Low ability readers allotted more time to task completion than high ability readers (p < .01).

3. ELT was least for high ability readers in the drill group, differences being significant between that group and: (1) low ability readers in the drill group (p < .01), (2) high and middle ability readers in the structuring group (p < .05), and (3) all levels of readers in the comprehension group (p < .05).

One measure of attitude toward the worksheets revealed a significant difference among groups (p < .01). More students in the drill group perceived the worksheets to be of an appropriate or high interest level than did students in the structuring and comprehension groups.
CHAPTER 1

INTRODUCTION AND RATIONALE

Student needs and the time and materials designated for satisfying those needs are critical variables in the study of the teaching-learning situation. Student needs are often assumed to be met by a curriculum which traditionally focuses on skill development and mastery of content in specific subject matter areas through the use of these skills. Reading, writing, and the ability to compute are some of the major cognitive skills that students hopefully develop as a result of time spent in school. Science and social studies are two content areas which are commonly included in the elementary school curriculum.

To gain skills or master subject matter, students are expected to participate in lesson activities which may assume a variety of formats. Most lesson activities involve reading from or listening to prose. In fact, it may be said that most of the knowledge acquired in a school environment comes from reading or listening to prose. Thus, an important goal in education has been to help people develop the ability to acquire information from reading and listening.
Theoretical Rationale

Learning from Prose

In general, the findings of research on learning from prose are consistent with the view that learning will be facilitated to the extent that the learner is able to adopt, or construct, an organizational scheme during learning which can act as a specific retrieval plan (Tulving and Donaldson, 1972). However, this generalization regarding learning from prose must necessarily be tempered by consideration of the nature of much of the research. That is, much of the prose research has centered on the free recall of word lists rather than on textual material. In classrooms, the expectation for students to learn from textual material is more common than the expectation to recall word lists.

Prose research which does focus on learning from textual materials appears to have taken one of three approaches. One approach is exemplified by studies (Arnold, 1942; Beauchamp, 1923; Carter, 1973; Germane, 1921; Matthews, 1938; Newlun, 1930) cited by Carter (1977). The approach taken by these researchers has been to influence directly the nature of the learner's processing of the organizational structure of the passage. This has been attempted by asking the student to engage in various activities, such as summarizing, outlining, or underlining text. These activities have been traditionally considered as useful aids to the student in the identification and processing of critical elements in the textual materials. The findings of four of the above cited studies (Arnold, 1942; Carter, 1973; Germane, 1921; and Matthews, 1938) were negative, contradicting the hypothesis that
procedures aimed at causing students to process aspects of the higher level conceptual structure of a passage are more facilitative of educational performance than reading or rereading alone.

However, Beauchamp (1923) and Newlun (1930) reported summarizing and outlining to be superior to reading alone. These two studies differed from those of Arnold (1942), Carter (1973), Germane (1921), and Matthews (1938) in that they were conducted in a naturalistic classroom setting over a period of months with school children. The study by Arnold (1942) which found negative results was also conducted under naturalistic conditions, but the subjects were college students.

The discrepancy among findings for those studies conducted in naturalistic settings may be a result of developmental differences. That is, older learners may engage spontaneously in the very behaviors which the investigators in the above studies sought to influence. Young learners, on the other hand, may have not yet acquired the sophisticated information search strategies typically possessed by adults. The fact that two studies (Beauchamp, 1923; Newlun, 1930), conducted in a natural classroom setting over an extended period of time and with children, did produce facilitative effects, suggests that it may be possible to enhance processing of prose materials with young learners via activities such as outlining, summarizing, and underlining of main ideas.

A second approach to research on learning from prose has involved the manipulation of adjunct materials for the purpose of providing a conceptual framework for material to be studied later. This is what Ausubel (1960) termed an "advance organizer." To quote Ausubel
"Cognitive structure is hierarchically organized in terms of highly inclusive concepts under which are subsumed less inclusive subconcepts and informational data." The implication of this view for Ausubel was that prior exposure to higher level concepts should facilitate the storage of subordinate information in memory.

A review of the advance organizer literature by Barnes and Clawson (1975) reveals conflicting evidence regarding the advance organizer hypothesis. However, using the meta-analytic technique described by Glass (1978), Luiten, Ames, and Ackerson (1980) have concluded that use of advance organizers does, indeed, have a positive effect on learning and retention. For those studies in which elementary school children were the subjects, an average effect size of +.33 standard deviation units for retention was demonstrated by the Luiten et al. (1980) analysis. This finding indicates that the average student in the average study receiving the advance organizer treatment performed better on measures of retention than 63 percent of control group individuals. This second category of prose research like the first category suggests the importance of facilitating the acquisition of general knowledge in grammar school-aged children via the acquisition of superordinate concepts.

The third general approach to prose research is exemplified by the work of Meyer (1975; 1977) and her colleagues (e.g., Meyer and McConkie, 1973). This approach involves the manipulation of the implicit structure of a prose passage. The goal of such research is to better understand how learners discover and use passage structure
to facilitate recall. Meyer's findings have been generally supportive of Ausubel's view which favors retention of superordinate ideas.

Much of the research falling within this third category (e.g., Carter, 1973; Frase, 1969; Meyer, 1975; 1977, Meyer and McConkie, 1973) has focused on free recall as the primary variable of interest. Since most educational measures of learning rely on some form of cued testing, it seems that measures relying on free recall of information are of somewhat limited educational relevance. This is not to minimize the use of free recall in studying memory for prose; rather it is to emphasize the importance of studying a greater variety of educational performances.

If there is a unifying theme in these different approaches to the study of learning from prose, it would seem to be the hypothesis that knowledge of the superordinate ideas in a prose passage will facilitate acquisition and recall of subordinate ideas or details. For purposes of educational relevance, future tests of this hypothesis must necessarily examine measures of cued recall. Test items calling for recall or recognition of details, in addition to items calling for comprehension of concepts, should also be included on any dependent measure of learning used to test this hypothesis.

Mathemagenic Activities

In addition to how students learn from prose, what they learn must also be considered. That is, what determines which information or knowledge a student acquires after exposure to expository prose? The content and organizational structure of the material is undoubtedly
important. However, the ultimate factor determining what the student learns is what the student does with the instructional material. Therefore, in any study of learning it is important to consider what Rothkopf (1970) has termed "mathemagenic" behaviors.

According to Rothkopf, mathemagenic behaviors are those student behaviors or activities which are relevant to the attainment of instructional objectives. The concept of mathemagenic activities tends to shift emphasis from the content and structure of the instructional materials themselves to the procedures which the student uses to assimilate those materials. Hence, instructional emphasis would be to promote student activities which allow for achievement with available materials.

Mathemagenic behaviors, then, activate the learning processes. Students engage in some mathemagenic activities, such as recitation and completion of workbook assignments, at the teacher's direction. Other mathemagenic activities are initiated by students. Student initiated activities are often covert and involve unobservable mental processes. Student participation in teacher initiated activities is, for the most part, observable and thus more amenable to empirical investigation than student initiated activity.

Learning Activities

Classroom lessons are presumably designed to facilitate initiation of activities which will result in effective learning. Nuthall and Snook (1973) suggest that lessons typically assume one of three formats: lecturing, teacher-pupil interaction, and seatwork.
Lecturing may be defined as that lesson format in which the teacher is solely in control of the presentation of subject matter. It is the teacher who speaks, performs, demonstrates, or exhibits materials. Opportunity for student response and feedback is seldom provided in a lecture format. Hence, lecturing alone does not appear to be particularly conducive to the stimulation of learning activity.

Teacher-pupil interaction refers to those lesson formats in which emphasis is placed on verbal exchange between students and the teacher. Discussion, recitation, and oral drill activities are examples of the teacher-pupil interaction lesson format. In these teacher-pupil interaction settings, the student is expected to attend to the progress of the lesson even though the opportunity for each student to respond or receive feedback will not be greater than six or seven times per hour (Dunkin and Biddle, 1974). While lessons in a teacher-pupil interaction format allow for more student activity than lessons presented in a lecture format, they do not appear to provide an optimal level of learning activity for individual students.

Lessons assuming a seatwork format generally require that students work individually on an activity without direct verbal interaction with the teacher. Seatwork is normally done by the students at their desks or other designated "seats" such as learning centers. Seatwork lessons may subsume a variety of activities such as silent reading, writing, copying, drawing, participation in learning center activities, computerized instruction, or completion of programmed text materials, workbook pages, textbook exercises, or worksheets. In general, it is
intended that seatwork lessons be completed in the classroom, differentiating them from homework assignments which are intended for completion at home. While seatwork assignments, such as group projects, are completed by groups of children working independently of the teacher, most types of seatwork are expected to be completed individually.

Seatwork lessons are presumed to provide opportunities for student learning independent of direct interaction with the teacher. The advantage of such lessons is that they may free teachers for other teaching duties, e.g., lesson planning and correcting assignments, and for work with individuals or groups of students.

The greatest opportunity for student response and subsequent feedback could be provided by a seatwork format. During seatwork assignments, the teacher can circulate throughout the classroom monitoring student responses on paper, providing instant feedback regarding those written responses, and evaluating whether the lesson has been understood by the students. Of the three general lesson types, seatwork formats appear to provide the greatest opportunity for student activity.

Research findings reveal that seatwork is the category to which the greatest amount of pupil time is assigned. McDonald (1977), in a study of 70 second-grade and 40 fifth-grade classrooms, reports that the dominant lesson activity was seatwork. Seatwork activities comprised from 40 to 60 percent of all time spent in lesson activities by students. In studies of students aged eight through eleven (Good and Beckerman, 1978; McDonald, 1977), the average time students spent in
independent seatwork activities was 50 percent of the school time allocated for lesson activities.

Despite the findings that the majority of students' school time is spent in seatwork activities, most research on teaching has centered on teacher-pupil interaction (Dunkin and Biddle, 1974). Hence, there appears to be a discrepancy between what researchers investigate (viz., teacher-pupil interaction) and how students are spending most of their lesson time (viz., in seatwork activities). If the greatest amount of school time is allocated to seatwork activities, then it seems plausible to assume that educators believe such a format is the most efficient and effective mode for meeting students' instructional needs. There is, then, a need for educational research which centers on cognitive skill development in a seatwork format.

A particularly typical format for seatwork lessons appears to be the worksheet or "ditto" sheet. However, there is a lack of published literature to document the degree to which worksheets and other forms of seatwork are actually used. An unpublished survey conducted at the elementary school level (Redfield, 1979) indicates that 100 percent of the respondents claimed to use worksheets as a form of seatwork; 95 percent to use workbooks; 75 percent to use textbook exercises; 65 percent to use learning centers; and 45 percent to use other activities such as games and puzzles. This survey seems to add credence to the belief that use of the worksheet as a form of seatwork is, indeed, widespread.

An implication of the extensive classroom use of worksheets is that there is a purpose behind using them and that various positive
outcomes are expected as a result of having assigned them. Knowledge of teacher intent and expectation of outcomes would provide valuable clues regarding variables for empirical investigation. Literature in the field of education contains many nonempirical discussions about the use of worksheets as a form of seatwork. However, empirical reports of teacher intent and outcome expectations centering on the use of worksheets are not reported in the research literature.

Responses to the Redfield (1979) survey revealed that:

1. One hundred percent of the respondents anticipated pupil development of independent work habits as a result of assigning worksheets.
2. Ninety-three percent of the respondents reported an expectation of increased achievement as a result of assigning worksheets.
3. Seventy percent reported the assignment of worksheets provided time for the teacher to work with individuals or groups of students.
4. Thirty-eight percent reported the belief that the assignment of worksheets resulted in better student behavior in the classroom.
5. Ten percent said that assignment of worksheets allowed the teacher to complete their own necessary paperwork.

Teachers were also asked why they made worksheet assignments. Two of the most commonly stated reasons were to: (1) reinforce skills or knowledge of reading or lecture material by providing opportunity for drill and practice, and (2) increase comprehension of lesson concepts by
providing enrichment activities designed to supplement reading or lecture material.

Follow-up interviews with several survey participants led to the conclusion that worksheet activities designed for drill and practice generally consist of questions or exercises requiring verbatim recognition or recall of factual information or details. Worksheets designed to increase concept comprehension generally present questions which require the student to respond by formulating and supporting an opinion, analyzing and evaluating information, or applying factual information to new situations.

Essentially, it appears that teachers use worksheets to promote mathemagenic behavior in students with the belief that such activity will result in greater learning from prose. The specific aim of using worksheets seems to be increasing two types of student knowledge, viz., (1) recall or recognition of facts and details, and (2) increased knowledge of concepts requiring what is commonly referred to as "comprehension." In this study, comprehension refers to the knowledge of superordinate ideas which allow for the evaluation, application, and/or analysis of factual information.

If, indeed, classroom teachers are using worksheets to promote mathemagenic activity in order to facilitate recall and comprehension of instructional material, a crucial question becomes, "What types of worksheets will have the desired effect?" To provide further clues for examining this question, it is necessary to consider the work of Craik and Lockhart (1972) on memory.
Levels of Processing

Craik and Lockhart (1972) present a "depth" or "levels of processing" model of memory rather than a multistore model (Murdock, 1967). Craik and Lockhart have chosen to focus on encoding operations rather than on memory stores and they view rate of forgetting as a function of the type and depth of encoding.

Many theorists seem to be in agreement that perception involves the rapid analysis of stimuli at a number of levels or stages (e.g., Treisman, 1964). This conception of hierarchically arranged processing states is often referred to as "depth of processing" where "depth" implies a greater degree of cognitive analysis.

Craik and Lockhart (1972) particularly refer to two types of processing. Type I processing involves repetition of analyses which have already been carried out. This type of processing should allow for recollection or recognition of details or subordinate information. Type II processing involves deeper analysis of the stimulus material than does Type I processing. Type II processing should result in comprehension of and memory for superordinate concepts. Retention of information is viewed as being positively correlated with the depth or level at which it is processed.

In addition, depth of processing models view attention as having an effect on retention. That is, as the amount of time spent on-task increases, retention time also increases. As attention to the task decreases, retention for the presented material decreases. In other words, length of retention and amount of time spent on-task are positively correlated.
According to Cooper and Pantle (1967), however, memory will improve with time spent on-task only at the deeper levels of processing. When study time consists of repetition of analyses which have already been carried out, the "total time hypothesis" breaks down. An educational implication is that time spent by students in drill activities is not as predictive of achievement performance as is time engaged in higher level activities requiring comprehension of concepts.

Incidental Learning

Another issue requiring examination in answering the question of which types of worksheets assist in producing positive achievement outcomes is that of incidental learning. Incidental learning is learning which occurs but is not prescribed by the assigned or orienting task. For example, an orienting task may require the student to match a series of vocabulary words with a corresponding list of definitions. While searching for various vocabulary words in a dictionary, the student may, by accident or out of personal interest, learn the meaning of words not appearing on the vocabulary list. Learning the meaning of unassigned vocabulary words, then, would constitute an incidental learning experience for the student.

The research literature on incidental learning, as reviewed by Postman (1964) and McLaughlin (1965), may be examined in light of the depth of processing notion. An important characteristic of the incidental learning paradigm is that the subject process the material in a way compatible with or determined by the orienting task. According to the Craik and Lockhart (1972) model, if the orienting task requires the
student to process the material at a deeper level than the incidental information requires, then incidental learning will occur. In other words, more incidental learning should occur when the orienting task, in this case worksheets, is designed to encourage Type II processing than when the task is designed to encourage Type I processing.

**Practical Rationale**

A purpose of worksheet assignments is to engage students in activities which may enhance learning. Worksheets are often assigned in conjunction with instruction involving reading from or listening to prose. Research findings on learning from prose are difficult to generalize to typical classroom situations because much of that research has utilized free recall of information as a dependent measure. Since most educational measures rely on some form of cued testing, relevance of future research findings could be enhanced by the inclusion of instruments based on cued recall as dependent measures.

Depth of processing models of memory suggest that the level at which information is processed will determine what information is recalled. Therefore, it is necessary that studies designed to facilitate retention of specific types of information, such as recall of details or information necessary to concept comprehension, provide dependent measures for those types of information.

Research (e.g., Cooper and Pantle, 1967) based on a depth of processing model further suggests that at higher levels of processing, time spent on-task is positively correlated to retention time. Findings from classroom studies (Fisher et al., 1978; Rosenshine and Berliner,
1978) support the hypothesis that achievement is positively related to time engaged in learning activities. Time on-task or engaged learning time (ELT), then, appears to be a salient variable in the study of activities designed to promote learning.

When incidental learning paradigms are viewed from a depth of processing perspective, it seems reasonable to expect greater amounts of incidental learning to occur as a result of Type II processing than as a result of Type I processing. Hence, dependent measures of incidental learning are called for when hypotheses concerning the effectiveness of mathemagenic activities designed to promote specific levels of processing are investigated.

The focus of this research was to examine the efficacy of using various types of worksheets to promote mathemagenic activities resulting in acquisition of knowledge presented in a prose format. Dependent measures of memory for details, comprehension of concepts, incidental learning, and ELT were included.
CHAPTER 2

REVIEW OF SELECTED LITERATURE

AND STATEMENT OF THE PROBLEM

Few studies reported in the research literature have been de-
signed to investigate the effect of using worksheets as a form of
independent seatwork. Many of the sources on worksheets and related
topics are in essay or editorial form and conclusions are not based on
scientific investigation. There are a number of teacher assigned activ-
ities which might include the use of worksheets, e.g., individualized or
independent study programs. Workbook and textbook exercises are often
similar to worksheets in format and task demands. Topics related to
worksheets will be briefly discussed, primarily to differentiate other
forms of seatwork from worksheets. However, only those studies which
specifically focus on the independent use of worksheets specifically
assigned by a teacher for independent completion by students in a class-
room are reviewed.

Review of Selected Literature

Independent Study and
Individualized Programs

Seatwork assignments, particularly worksheets designed to be
completed independently by students, may be included in independent
study programs or programs designed to meet the needs of individual
students. However, empirical studies designed specifically to investigate the effect of using worksheets in such programs do not appear in the research literature. One reason for this may be that independent and individualized study programs often require students to make choices regarding the lesson activities in which they will participate. Worksheet assignments, by nature of their intent, usually focus on specific, teacher-initiated activities.

Workbooks and Textbook Exercises

Workbook pages, textbook exercise pages, and worksheets are often similar in format. Workbooks and workbooks are consumable; textbook exercises require that students respond on a separate sheet of paper. Activities appearing in these three formats appear to be typified by matching, sentence completion and/or open response exercises at the elementary school level. Such exercises are presumably designed for drill and practice or increasing comprehension of concepts.

While textbook and workbook exercises are prepared by someone other than the teacher, hence reducing teacher preparation time, little is reported by the publisher regarding the derivation of these activities. In other words, teachers seldom know by whom the workbook exercises were designed. Neither is it known whether there was any collaboration with those who wrote the accompanying textbook or developed assessment materials. Finally, the intent of many of the exercises is unknown. On the other hand, teachers may design exercises in worksheet format to meet specific content and outcome goals.
In a correlational study of first- and third-grade classrooms participating in Project Follow-Through, Stallings (1977) found a positive correlation between reading and math test scores and frequent classroom use of workbooks. Stallings also reported that a higher degree of on-task behavior occurred when textbooks and workbooks were used in the classroom than when they were not.

Other research literature on workbook activities tends to compare the effectiveness of using workbooks to other types of seatwork activities (Bobbitt, 1972; Docter, 1960; Graves, 1969). These comparison studies indicate few significant differences between using workbooks and other seatwork activities on student outcome measures. Only one reported study (Willins, 1978) addresses the more interesting issue regarding the relative effectiveness of various aspects of workbook activities themselves.

Bobbitt (1972) conducted a study with preschoolers in which measures of auditory discrimination skills, visual discrimination skills, and concepts served as the dependent variables. Active games versus workbook activities was the independent variable. Analysis of covariance, using pretest scores as the covariate, revealed a difference significant at the .05 level in favor of the workbook treatment on the measure of auditory discrimination skills.

Docter (1960) found statistically significant differences between gain scores of classes using workbook and nonworkbook follow-up activities in both reading comprehension and vocabulary. These differences favored the nonworkbook classes at the first grade level and the
workbook classes at grade levels two, three, and four. There were no significant differences at the fifth- or sixth-grade levels. It may be that first-grade children do not yet have the reading skills necessary for efficient workbook use. By the fifth- and sixth-grades, the wide variation in individual interests and skills, as well as familiarity with the medium, may somewhat reduce the efficiency of the workbook as an instructional tool.

Graves (1969), who conducted a study regarding the effectiveness of using workbooks in the teaching of eighth-grade English grammar, found no significant differences at the .05 level between the experimental and control groups on any of five dependent measures. Students in the experimental groups used workbooks. Students in the control groups did not use workbooks; rather, they engaged in whatever other drill activities the participating teachers were accustomed to using. Three of Graves' (1969) dependent variables were measures of some aspect of English grammar. Instead of using t-tests, as he did, to test for significance, he could have increased statistical power by considering these three variables as trials and using a repeated measures design. Although Graves did not demonstrate statistical significance at the .05 level or lower, all experimental subgroups showed greater gains in mechanics of English than did control groups. It seems that setting alpha levels higher than .05 may be warranted for classroom research whenever the researcher is more interested in gleaning information than in controlling for Type I error.
In contrast to Bobbitt (1972), Docter (1960), and Graves (1969), who compared the effectiveness of workbook activities to other types of seatwork activities, Willins (1978) investigated the effects of variable directions and formats in reading workbooks with third- and fourth-grade children. Willins' primary concern was how the length of task directions and workbook page format affected pupil performances. A 3 (type of directions) x 4 (workbook page format) factorial design was used. Pertinent findings indicated that:

1. Shorter directions resulted in the greatest number of response attempts, the lowest use of visual cues such as accompanying pictures or examples, and the fewest direction errors.
2. Long directions produced the most direction errors, the lowest response levels, and the greatest use of visual cues regardless of format.
3. Formats containing an example provided the highest response level and the greatest use of visual cues regardless of direction length.
4. Direction errors were greatest when the format was unfamiliar.

Worksheets

All studies on worksheets reported in the research literature used worksheets in a supplemental fashion, i.e., in addition to other forms of instruction such as reading assignments, lectures, or discussions. One source (Steady, 1978) reported use of an individualized program based on worksheets. While Steady's work is not based on experimental study, he contends that when he used a worksheet format
which accommodated varying ranges of student ability, his high school students worked diligently on a unit in electricity and classroom discipline problems virtually disappeared.

Two studies were conducted in university settings. Johs (1974) reports having used lecture-discussion methods to teach mathematics to elementary education majors. The class receiving the treatment was assigned instructor-developed worksheets as homework; the control class was given homework assignments from the adopted textbook. Johs' rather weak conclusion was that future research concerning mathematics for prospective elementary teachers should consider student classification as a variable. In Johs' experiment, group membership was perfectly confounded with the treatment variable.

Brown (1979) investigated the effect of supplementary materials designed to accompany an audio-cassette presentation on both immediate and delayed recall. The experimental subjects were freshmen in a university English class. The treatment for two of the six comparison groups included use of worksheets. One of the two worksheet treatment groups was provided with instructional objectives while the other was not. Pertinent findings were that:

1. Use of the worksheet served as an aid to immediate recall more than listening alone. This difference was not maintained over a two week period of time.

2. Use of instructional objectives along with the worksheet was also more effective than listening alone. This difference was maintained after a two-week period.
3. Use of instructional objectives and the worksheet together was no more value for immediate recall than the act of taking written notes; however, after two weeks, retention of information was greater for the group which had used instructional objectives and worksheets than for the group which had taken written notes while listening to the audio-tape.

Two other studies reported in the research literature (McPeake, 1979; Morine et al., 1976) were conducted in elementary schools. McPeake (1979) investigated the effects of study worksheets in self-instructional, programmed format, different levels of reading ability, and sex on the spelling performances of sixth-grade students. McPeake concluded that the study worksheets improved general spelling achievement for all group combinations except boys in low reading groups and that 12 weeks of using the study worksheets did not result in a transfer of spelling learning to unstudied words. She also found that reading level was significantly related to spelling achievement.

In an evaluation study of teacher planning practices (Morine et al., 1976), it is reported that while the 40 teachers studied tended to include worksheet assignments as part of their lesson plans, there were no significant differences in this tendency between teachers of pupils with high or low achievement gain scores. Teachers of second-grade pupils with high gain scores tended to make fewer reading worksheets than teachers of second-grade pupils with lower gain scores. This difference, however, was not significant.
The one study (Frank, 1970) which examined the achievement effects of different types of worksheets was done with intermediate-aged (9 1/2 to 16 1/2 year old) educable mentally retarded pupils in mathematics. Variables studied by Frank were: (1) immediate feedback provided by an answer column on the worksheet, (2) amount of problems placed on each page, and (3) novelty effect of using colored paper for some worksheets. Frank's only statistically significant finding was for white paper over colored paper for pupils older than 12 years.

In summary, a review of the literature indicates no clear superiority of one type of seatwork over another for affecting student outcomes. The literature does provide evidence that making seatwork assignments is a widespread practice and that teacher prepared and/or developed worksheets are often used to supplement or provide drill over materials presented in reading, lecture, or discussion formats.

While several studies conclude that worksheets result in positive student outcomes, only two investigators, Frank (1970) and Willins (1978), have attempted to explore some of the worksheet or workbook page variables influencing outcome measures. Willins' (1978) primary concerns were clarity of directions and import of visual cues. Frank's (1970) study was conducted with a small sample of retardates and his trivial findings may not apply to any other situation.

Worksheets, like other forms of seatwork, are widely used. No more information is available regarding the effective aspects of worksheets than exists for other forms of seatwork. The content material and processes tapped by worksheet activities is amenable to experimental
manipulation. It seems, therefore, that an empirical investigation of which worksheet variables are most efficient for producing specified outcomes for students of varying abilities is needed.

Statement of the Problem

The apparent extensive use of worksheets as a form of seatwork resulting in positive student outcomes has limited documentation in empirical literature. However, research does support the notion that mathemagenic activity is necessary for learning to occur. Worksheets are ideally suited for specific classroom uses because teachers may control both their format and content.

An implication of the literature on learning from prose and levels of memory processing is that worksheets may be developed to tap different levels of processing, hence resulting in varying levels of knowledge acquisition. Specifically, worksheets could be designed to facilitate recall of subordinate ideas or detail by calling for drill over those ideas. Higher levels of processing could be promoted via use of worksheets requiring the student to demonstrate comprehension of concepts or to structure the material by outlining or selecting main ideas.

Theory suggests that those students engaging in activities at higher levels of processing will also gain in acquisition of incidental and subordinate knowledge (Craik and Lockhart, 1972). Unless they initiated other activities, students assigned to activities requiring recall of detail would not be expected to acquire superordinate knowledge. Further, it is to be expected that time spent engaged in mathemagenic activity is positively related to achievement, particularly
at levels of processing requiring comprehension or structuring of superordinate ideas (Cooper and Pantle, 1967; Craik and Lockhart, 1972).

Hence, the primary questions investigated by the present research were:

1. How does the type of worksheet used as a follow-up activity to presentation of prose material affect acquisition of knowledge for students of different reading abilities? To reflect current educational practices, the measure of knowledge consisted of cued recall of details, concepts, and incidental instructional material. Knowledge acquisition was measured immediately following treatment and four weeks thereafter.

2. Is time allocated to and engaged in the learning task related to the type of worksheet a student is assigned to complete?

Other variables investigated were students' attitude toward the various worksheet treatments and the relationship between reading ability and demonstrated acquisition of knowledge. Reading ability was included as a variable because it is likely to be correlated with any measure of achievement.
Target Population

The target population consisted of fifth-grade students currently studying social studies. Social studies was selected as a subject area for the following reasons:

1. The content covered across fifth-grade classrooms is relatively consistent.

2. Order of lesson presentation or ability grouping may not be as crucial as it is to some other curriculum areas (e.g., mathematics or reading) and, therefore, readily lends itself to experimental manipulation.

3. Ability grouping for social studies instruction does not seem to be a typical classroom practice.

Fifth-grade was chosen as the level for experimental exploration because:

1. The content of the social studies curriculum in the intermediate grades is quite substantive lending credence to the use of drill and/or enrichment assignments.
2. Use of drill and/or comprehension worksheets appears to be an integral part of the social studies curriculum.

Accessible Population

The accessible population consisted of eight fifth-grade classrooms and one combination fourth-/fifth-grade classroom in three elementary schools located in Tucson, Arizona. These are the same three schools in which the Redfield (1979) survey on seatwork practices was conducted. Therefore, the sample of classrooms randomly drawn from this three-school pool was considered representative of seatwork assignment practices in the accessible population.

In terms of educational background, ethnic origin, mobility, and median household income, this accessible population appears fairly representative of Tucson as a whole. Results of a 1978 survey (Tucson Trends, 1978) appear in Table 1.

Census tract information obtained in October, 1975 indicated that for Tucson as a whole, 94 percent of the population is white. In the accessible population (located in census tracts 40.11, 40.12, and 40.19), 95 percent of the population is white (Special Census, 1976). Those of Spanish origin, however, were counted in the white population. If the Spanish population is examined separately, 22.6 percent of Tucson's total population is of Spanish origin. It is estimated that only nine percent of the population in the area containing the accessible schools is of Spanish origin. However, recent desegregation efforts may cause the schools to be more racially balanced than this census information would indicate.
Table 1. Ethnographic statistics for the accessible population

<table>
<thead>
<tr>
<th></th>
<th>Tucson as a Whole</th>
<th>Accessible Population (Economic District #11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Years of School Attended</td>
<td>13.2</td>
<td>12.7</td>
</tr>
<tr>
<td>Length of Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in Owned Housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than one year</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>One to five years</td>
<td>29%</td>
<td>31%</td>
</tr>
<tr>
<td>More than five years</td>
<td>57%</td>
<td>52%</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$13,886</td>
<td>$13,529</td>
</tr>
</tbody>
</table>

Sample

Five classrooms from the accessible pool of eight and a half fifth-grade classes were randomly selected. Students across classrooms were randomly assigned to treatment groups; therefore, students rather than classrooms were the units of analyses.

Experimental Procedures

Students across the five classes were ranked on reading ability as measured by the reading subtest of the Comprehensive Test of Basic Skills (CTBS). The CTBS was administered to all fifth-grade students in October, 1979. Ranked subjects were then divided into equal thirds—high, middle, and low reading levels. Within each level, students were then randomly assigned to one of three treatment groups.
The treatment was type of worksheet. Types of worksheets were: (1) those designed to elicit recall or recognition of factual information or details, hereafter referred to as the "drill" treatment; (2) those designed to promote comprehension of superordinate lesson concepts by requiring analysis, evaluation, or application of the factual lesson material, hereafter referred to as the "comprehension" treatment; and (3) those requiring the student to locate and write main ideas appearing in the text, hereafter referred to as the "structuring" treatment.

Prior to the first day of the experiment, teachers of classes participating in the study were trained in experimental procedures by the experimenter. On each of three days during the week of April 14, 1980, students were presented with an experimenter-prepared, teacher-read introduction to the day's lesson. Scripted lessons were used to facilitate equality of presentation across classrooms. A copy of the script for each lesson appears in Appendix A.

The textual lesson material included in each lesson script appears in Chapter 21, entitled "Growing Businesses," of the fifth-grade social studies textbook entitled Social Studies (Scott, Foresman and Company, 1979). The emphasis of lesson one, "Machines Take Over," was the invention of work-saving machines. The emphasis of lesson two, "From Rags to Riches," was on the business cycle. The emphasis of lesson three, "Women Fight for Their Rights," was the role of women in the growth of businesses.

After presentation of the scripted introduction, students were asked to follow along in their social studies textbook while the teacher
read the designated textual material aloud. Teacher reading of the text was required to ensure that each student heard the lesson material at least once despite a variation in student reading abilities.

Following teacher reading of each lesson, folders were distributed to the students. Treatment group assignment determined the type of worksheet contained in each student's folder. Copies of the worksheets appear in Appendices B, C, and D. Students were told they could refer to their books to aid in worksheet completion.

To provide for consistency of teacher participation across classrooms, teachers were instructed to be available for assistance to pupils upon request, but were also instructed not to initiate any teacher-pupil interaction. Feedback to students consisted of returning their corrected worksheets on the school day following worksheet completion. All worksheets were experimenter corrected; incorrect answers were marked with a check (✓) to reflect the procedure normally used by the participating teachers. Students were directed to individually approach the teacher with any questions regarding their corrected worksheets. This instruction was used to avoid having different classrooms of children exposed to differing questions and possible ensuing discussions.

Time allowed for lesson presentation and worksheet completion across all classrooms on each of the treatment days was 50 minutes. This amount of time proved sufficient for even the slowest workers to complete their worksheets. At the bottom of each worksheet students were asked to write down the time at which they had finished. These
data were later analyzed to determine differences among levels and treatments as to how much time children chose to allocate to lesson completion, hereafter referred to as "allocated time." Those students who finished before 50 minutes had elapsed were instructed to silently read a library book or complete other unfinished class assignments.

Five controls, then, were implemented to allow for clearer interpretation of the effects of the worksheets on achievement. These controls were provisions for: (1) consistency of lesson format via use of scripted lessons and teacher reading of the text, (2) consistency of teacher involvement by limiting teacher-initiated interactions with pupils during the time allotted for worksheet completion, (3) consistent time allotments for lesson completion across classrooms, (4) consistency of activities for students completing their worksheets before the end of the lesson period, and (5) consistency of feedback to students.

Attached to the worksheets designed for the third treatment lesson was an experimenter-designed questionnaire designed to assess students' attitude toward and perception of the treatment. Students were asked to respond to a total of four questions regarding interest level, difficulty, perceived purpose, and usefulness of the worksheets. A copy of the questionnaire appears in Appendix E.

Two classroom observers were present on each of the treatment days in each of the classrooms to code on-task behavior, hereafter referred to as "engaged learning time (ELT). ELT is, for this study, defined as the percentage of allocated time a student appeared to actually attend to the task at hand.
The classroom observers of ELT were trained by the experimenter in a session where parameters and procedures were established and confirmed. Prior to the first day of the experiment, each observer, supervised by the experimenter, practiced the agreed upon procedures in one of the selected classrooms.

On each day of the experiment observers were instructed to randomly select two students from each treatment group for observation. Treatment group could be easily noted as the students' worksheets were color coded. The observers, as well as the teachers and students, were unaware of the meaning of the color code. Observers were then asked to note which corner of the selected students' worksheets had been clipped. Different clipped edges represented different reading blocks. Again, the observers, teachers, and students were unaware of the meaning of the code. Each observer then charted the behavior of the selected students by establishing a sequence of observation whereby one of the six selected children was observed every ten seconds and each of the six children was observed once per minute.

The two observers assigned to each classroom worked independently. Hence, 12 children were observed per classroom per lesson resulting in approximately 180 total observations (12 children x 5 classrooms x 3 lessons).

It was anticipated that some children would complete their worksheets within 15 minutes after folder distribution. The measure desired was the proportion of engaged time to the amount of time each individual child allocated to lesson completion despite the 50 minute experimental
allotment. Therefore, each observation period consisted of only the first 15 minutes following distribution of folders. Ultimately, only data for those students using at least the first ten minutes were analyzed as some children completed their worksheets in less than 15 minutes. A copy of the form used to code ELT appears in Appendix F.

The observers had been trained in the experimental classrooms prior to the treatment days, thereby reducing possible novelty effects of their presence during the experiment. Interrater agreement was established prior to the first day of the experiment. Using the formula for averaging correlations described by McNemar (1969), interrater agreement across the pool of seven observers was .88.

On the Monday directly following the week of the experiment, an experimenter-developed achievement test over the instructional material covered the previous week was administered. This achievement measure consisted of 20 items calling for recognition or recall of factual information and 20 items requiring the student to demonstrate comprehension of superordinate lesson concepts. Within each of these item categories--recognition/recall and comprehension--ten items measured knowledge of incidental material and ten items measured knowledge of nonincidental facts or concepts which had been presented by either the drill or comprehension worksheets. Hence, the only treatment group not intentionally exposed to some of the test details or concepts during treatment was the structuring treatment group. Test items were randomly ordered, i.e., they were not grouped by categories.

Each student received four scores on the achievement posttest. These four scores were for the following categories, each containing
ten items: (1) recall or recognition of nonincidental material (RN), (2) recall or recognition of incidental material (RI), (3) comprehension of nonincidental material (CN), and (4) comprehension of incidental material (CI). Reliability of the achievement posttest was established using coefficient alpha (Cronbach, 1951). Coefficient alpha for the 40 items was .74. Subscale reliabilities, using coefficient alpha, for the RN, RI, CN, and CI scales were .60, .45, .29, and .44, respectively. A copy of the Social Studies Achievement Posttest appears in Appendix G.

Four weeks following administration of the achievement posttest, a 20-item follow-up test was administered. The follow-up test consisted of five items from each of the RN, RI, CN, and CI categories on the posttest. The follow-up test was limited to 20 items for pragmatic reasons.

Because of the limited number of items and because items previously used on the posttest could no longer be considered measures of incidental learning, only comprehension and recognition/recall subscores were computed. That is, RN and RI items were combined to form a ten item recognition/recall (R) subscale; CN and CI items were combined to form a ten item comprehension (C) subscale. Coefficient alpha for the 20-item follow-up test was .69. Coefficient alphas for the R and C subscales were .44 and .63, respectively. A copy of the Follow-up Social Studies Achievement Test appears in Appendix H.

Lesson Materials

On each day of treatment, student lesson materials consisted of the social studies textbook (Scott, Foresman and Company, 1979) and a folder containing a worksheet. To facilitate teacher distribution of
appropriate worksheets, the worksheets were placed in folders labeled with the students' names. This procedure eliminated the need for students to identify their worksheets, thereby allowing these raw data to remain anonymous to the experimenter who corrected them. On each day of the experiment, teacher lesson materials consisted of a lesson script, social studies textbook, and answer keys for the three types of worksheets used to reinforce the day's lesson.

**Research Questions**

The dependent variables in this study, which have been previously defined, were posttest social studies achievement, follow-up social studies achievement, ELT, allocated time, and attitude toward the treatment. The independent variable for all analyses was type of worksheet. Reading level was used as a blocking variable for all analyses except those relating to the attitude measures. Alpha for all analyses, including post hoc comparisons, was set at .05.

The research questions investigated by this study were:

1. Does type of worksheet and/or reading level and/or an interaction between the two have an effect on acquisition of information presented in a prose format? Acquisition of knowledge was measured by an achievement posttest consisting of four (RN, RI, CN, and CI) subscales.

2. Does type of worksheet and/or reading level and/or an interaction between the two have a long-term (four weeks) effect on memory for information presented in a prose format? Memory
for recall or recognition of details and concept comprehension were measured by a 20-item follow-up test consisting of two (R and C) ten item subscales.

3. Does type of worksheet and/or reading level and/or an interaction between the two have an effect on ELT? ELT was determined via examination of the data collected by classroom observers.

4. Does type of worksheet and/or reading level and/or an interaction between the two influence how much time students choose to allocate to task completion? Allocated time was determined by examining the time of worksheet completion noted by students on the bottom of each worksheet.

5. Does student attitude toward the treatment differ among treatment groups? Data were collected on four questions; hence, four analyses were performed.
CHAPTER 4

RESULTS

Posttest Achievement

The achievement test data obtained after three days of treatment were analyzed using a 3 (treatment group) x 3 (levels) x 4 (trials) repeated measures analysis of variance for equal n's. Data were randomly deleted to obtain equal n's of ten per cell. Descriptive statistics for posttest achievement are presented in Table 2; a summary of the analysis of variance is presented in Table 3.

Significant effects were found for levels (F = 21.08; df = 2, 81; p < .001) and for trials (F = 80.98; df = 3, 243; p < .001). Tukey's HSD test (Kirk, 1968) was used to make pairwise post hoc comparisons of the significant findings.

Post hoc comparisons revealed that high level readers performed significantly better than low level readers across all trials and treatments (p < .01). Middle level readers also performed significantly better than low level readers across all trials and treatments (p < .01). These results are depicted in Figure 1.

Post hoc comparisons also demonstrated that performance on the RN subscale was significantly higher than performance on the RI, CN, and CI subscales across all treatments and levels (p < .01). In addition, performance on the RI and CN subscales was significantly superior to
Table 2. Posttest achievement—means and standard deviations for RN, RI, CN, and CI subscales

<table>
<thead>
<tr>
<th>Group x Level</th>
<th>Subscale</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RN</td>
<td>SD</td>
<td>RI</td>
<td>SD</td>
<td>CN</td>
</tr>
<tr>
<td>Drill x High</td>
<td></td>
<td>8.2</td>
<td>1.25</td>
<td>6.2</td>
<td>1.78</td>
<td>6.4</td>
</tr>
<tr>
<td>Drill x Middle</td>
<td></td>
<td>7.0</td>
<td>1.10</td>
<td>6.5</td>
<td>0.92</td>
<td>5.2</td>
</tr>
<tr>
<td>Drill x Low</td>
<td></td>
<td>6.3</td>
<td>1.73</td>
<td>5.1</td>
<td>2.02</td>
<td>4.7</td>
</tr>
<tr>
<td>Comprehension x High</td>
<td></td>
<td>8.6</td>
<td>1.50</td>
<td>6.8</td>
<td>1.33</td>
<td>6.1</td>
</tr>
<tr>
<td>Comprehension x Middle</td>
<td></td>
<td>7.5</td>
<td>1.57</td>
<td>6.1</td>
<td>1.22</td>
<td>5.5</td>
</tr>
<tr>
<td>Comprehension x Low</td>
<td></td>
<td>5.4</td>
<td>1.74</td>
<td>4.0</td>
<td>1.34</td>
<td>4.7</td>
</tr>
<tr>
<td>Structuring x High</td>
<td></td>
<td>7.4</td>
<td>2.06</td>
<td>5.4</td>
<td>1.69</td>
<td>6.6</td>
</tr>
<tr>
<td>Structuring x Middle</td>
<td></td>
<td>7.7</td>
<td>1.90</td>
<td>5.5</td>
<td>1.86</td>
<td>5.8</td>
</tr>
<tr>
<td>Structuring x Low</td>
<td></td>
<td>5.1</td>
<td>1.58</td>
<td>5.2</td>
<td>1.99</td>
<td>4.8</td>
</tr>
</tbody>
</table>
Table 3. Posttest achievement—summary of analysis of variance

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>2</td>
<td>2.48</td>
<td>.51</td>
<td>n.s.</td>
</tr>
<tr>
<td>Levels</td>
<td>2</td>
<td>101.80</td>
<td>21.08</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treatment x Levels</td>
<td>4</td>
<td>2.32</td>
<td>.48</td>
<td>n.s.</td>
</tr>
<tr>
<td>Error</td>
<td>81</td>
<td>4.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trials</td>
<td>3</td>
<td>173.29</td>
<td>80.98</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Groups x Trials</td>
<td>6</td>
<td>1.53</td>
<td>.71</td>
<td>n.s.</td>
</tr>
<tr>
<td>Levels x Trials</td>
<td>6</td>
<td>2.54</td>
<td>1.19</td>
<td>n.s.</td>
</tr>
<tr>
<td>Groups x Levels</td>
<td>12</td>
<td>2.58</td>
<td>1.21</td>
<td>n.s.</td>
</tr>
<tr>
<td>Error</td>
<td>243</td>
<td>2.14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Posttest means for treatment groups by levels by trials
performance on the CI subscale across all treatments and levels (p < .01). These findings are illustrated in Figures 2 and 3.

**Follow-up Achievement**

The achievement test data obtained four weeks following post-testing were analyzed using a 3 (treatment groups) x 3 (levels) x 2 (trials) repeated measures analysis for equal n's. Data randomly deleted for subjects in the posttest analysis were deleted from the follow-up analysis. Several other deletions were necessary due to absence of four subjects from school on the day of follow-up testing. Hence, additional random deletion of data resulted in an n of nine per cell. Descriptive statistics for follow-up achievement are presented in Table 4; a summary of the analysis of variance is presented in Table 5.

Significant effects were found for levels (F = 17.73; df = 2, 72; p < .001), for trials (F = 60.00, df = 1, 72; p < .001), and for the treatment x levels interaction (F = 2.53; df = 4, 72; p < .05). Tukey's HSD test was used to make pairwise post hoc comparisons of the significant findings.

Post hoc comparisons for the levels effect revealed that high level readers and middle level readers performed significantly better than low level readers across all treatment levels and trials (p < .01). This finding is depicted in Figure 4.
Figure 2. Posttest means for trial performances by treatment group
Figure 3. Posttest means for trial performances by reading level
Table 4. Follow-up achievement—means and standard deviations for R and C subscales

<table>
<thead>
<tr>
<th>Group x Level</th>
<th>Subscale</th>
<th>R</th>
<th>SD</th>
<th>C</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill x High</td>
<td></td>
<td>7.56</td>
<td>.83</td>
<td>6.44</td>
<td>1.77</td>
</tr>
<tr>
<td>Drill x Middle</td>
<td></td>
<td>7.11</td>
<td>.99</td>
<td>4.22</td>
<td>1.99</td>
</tr>
<tr>
<td>Drill x Low</td>
<td></td>
<td>6.00</td>
<td>1.41</td>
<td>3.22</td>
<td>1.75</td>
</tr>
<tr>
<td>Comprehension x High</td>
<td></td>
<td>7.56</td>
<td>1.64</td>
<td>6.22</td>
<td>1.03</td>
</tr>
<tr>
<td>Comprehension x Middle</td>
<td></td>
<td>7.00</td>
<td>1.49</td>
<td>5.22</td>
<td>1.75</td>
</tr>
<tr>
<td>Comprehension x Low</td>
<td></td>
<td>4.89</td>
<td>1.37</td>
<td>3.22</td>
<td>1.31</td>
</tr>
<tr>
<td>Structuring x High</td>
<td></td>
<td>6.44</td>
<td>1.89</td>
<td>4.56</td>
<td>1.42</td>
</tr>
<tr>
<td>Structuring x Middle</td>
<td></td>
<td>7.33</td>
<td>1.49</td>
<td>5.11</td>
<td>1.79</td>
</tr>
<tr>
<td>Structuring x Low</td>
<td></td>
<td>5.33</td>
<td>1.33</td>
<td>4.33</td>
<td>2.21</td>
</tr>
</tbody>
</table>
Table 5. Follow-up achievement--summary of analysis of variance

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>2</td>
<td>.82</td>
<td>.26</td>
<td>n.s.</td>
</tr>
<tr>
<td>Levels</td>
<td>2</td>
<td>56.86</td>
<td>17.73</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treatment x Levels</td>
<td>4</td>
<td>8.10</td>
<td>2.53</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>3.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within Groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trials</td>
<td>1</td>
<td>138.89</td>
<td>60.00</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Groups x Trials</td>
<td>2</td>
<td>1.72</td>
<td>.74</td>
<td>n.s.</td>
</tr>
<tr>
<td>Levels x Trials</td>
<td>2</td>
<td>2.47</td>
<td>1.06</td>
<td>n.s.</td>
</tr>
<tr>
<td>Groups x Levels x Trials</td>
<td>4</td>
<td>2.02</td>
<td>.87</td>
<td>n.s.</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>2.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 4. Follow-up achievement test means for levels by trials
Post hoc examination of the treatment by levels interaction indicated no significant interactions for the R trial. That is, on the R subscale high and middle level readers performed significantly better than low level readers across all treatments (p <.01). This finding is illustrated by Figure 5.

Significant treatment by levels interactions were found for the C trial. High level readers in the drill treatment group performed significantly better on the C subscale than low level readers in the drill or comprehension treatment groups (p <.01). High level readers in the comprehension treatment group also performed better on the C subscale than low level readers in the drill or comprehension treatment groups (p <.05). These findings are illustrated by Figure 6.

Finally, post hoc comparisons demonstrated that performance on the R subscale was superior to performance on the C subscale across all treatments and levels (p <.01). This finding is illustrated by Figures 7 and 8.
Figure 5. Follow-up achievement test means for levels by treatment groups for the R subscale
Figure 6. Follow-up achievement test means for levels by treatment groups for the C subscale.
Figure 7. Follow-up achievement test means for trial performances by treatment group.
Figure 8. Follow-up achievement test means for trial performances by reading level
Engaged Learning Time

The data for ELT were analyzed using a 3 (treatments) x 3 (levels) two-way analysis of variance for equal n's. After random deletion of data to create equal n's, n per cell was nine. Descriptive statistics for the ELT analysis appear in Table 6; a summary of the analysis of variance is presented in Table 7.

Table 6. ELT--means and standard deviations for treatments by levels

<table>
<thead>
<tr>
<th>Levels</th>
<th>Drill ( \bar{X} ) SD</th>
<th>Treatments ( \bar{X} ) SD</th>
<th>Structuring ( \bar{X} ) SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>6.89 2.96</td>
<td>9.22 .63</td>
<td>9.11 .99</td>
</tr>
<tr>
<td>Middle</td>
<td>9.00 1.25</td>
<td>9.56 .68</td>
<td>9.33 .47</td>
</tr>
<tr>
<td>Low</td>
<td>9.56 .68</td>
<td>9.11 .74</td>
<td>8.44 1.77</td>
</tr>
</tbody>
</table>
Table 7. ELT--summary of analysis of variance

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>2</td>
<td>4.53</td>
<td>2.19</td>
<td>n.s.</td>
</tr>
<tr>
<td>Levels</td>
<td>2</td>
<td>5.64</td>
<td>2.73</td>
<td>n.s.</td>
</tr>
<tr>
<td>Treatment x Levels</td>
<td>4</td>
<td>7.29</td>
<td>3.53</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>2.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A significant effect was found for the treatment x levels interaction ($F = 3.53; df = 4, 72; p < .05$). Using Tukey’s HSD test for pairwise comparisons, post hoc analysis of the significant interaction between levels and treatments indicated that:

1. Low level readers in the drill treatment group spent a significantly greater percentage of time on-task than did high level readers in the same treatment group (p < .01).

2. High and middle level readers assigned to the structuring treatment had a significantly higher engagement rate than high readers in the drill treatment group (p < .05).

3. Readers at all levels in the comprehension group spent significantly more time on-task than high level readers in the drill treatment group (high readers and low readers, p < .05; middle readers, p < .01). These findings are illustrated in Figures 9 and 10.
Figure 9. Means for ELT by treatment group
Figure 10. Means for ELT by reading levels
Allocated Time

The data for allocated time were analyzed using a 3 (treatments) x 3 (levels) two-way analysis of variance for equal n's. Number of subjects per cell, following random deletion of data, was nine. Descriptive statistics for the allocated time analysis appear in Table 8; a summary of the analysis of variance is presented in Table 9.

Table 8. Allocated time across three lessons—means and standard deviations for treatments by levels

<table>
<thead>
<tr>
<th>Levels</th>
<th>Drill X</th>
<th>X SD</th>
<th>Comprehension X</th>
<th>X SD</th>
<th>Structuring X</th>
<th>X SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>66.33</td>
<td>12.03</td>
<td>68.78</td>
<td>10.66</td>
<td>81.78</td>
<td>11.03</td>
</tr>
<tr>
<td>Middle</td>
<td>72.89</td>
<td>10.87</td>
<td>75.44</td>
<td>13.12</td>
<td>84.22</td>
<td>11.73</td>
</tr>
<tr>
<td>Low</td>
<td>75.44</td>
<td>14.18</td>
<td>82.33</td>
<td>11.86</td>
<td>91.89</td>
<td>12.81</td>
</tr>
</tbody>
</table>
Table 9. Allocated time across three lessons—summary of analysis of variance

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>2</td>
<td>1532.83</td>
<td>9.56</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Levels</td>
<td>2</td>
<td>839.05</td>
<td>5.23</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Treatment x Levels</td>
<td>4</td>
<td>28.18</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>160.40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant effects were found for treatment ($F = 9.56; df = 2, 72; p < .001$) and for levels ($F = 5.23; df = 2, 72; p < .01$). Post hoc pairwise comparisons using Tukey's HSD test indicate that students in the structuring treatment group allotted significantly more time for task completion than students in either the drill or comprehension treatment groups regardless of reading level ($p < .01$). This finding is illustrated in Figure 11. Another significant pairwise finding was that low level readers allotted more time to task completion than high level readers across all treatment groups ($p < .01$). This finding is illustrated in Figure 12.
Figure 11. Means for allocated time by treatment group
Figure 12. Means for allocated time by reading level
Perception of the Treatment

All data pertaining to attitude toward or perception of the treatment were analyzed using the likelihood-ratio statistic (Kullback, Kupperman, and Ku, 1962). The likelihood-ratio statistic ($X^2_L$) is a variant of Pearson's chi-square. Using $X^2_L$ allows for post hoc comparisons because the statistic is additive and can be partitioned exactly into independent parts whereas the Pearson statistic, in general, cannot. Four analyses were performed, one for each of the questions appearing on the Attitude Questionnaire located in Appendix E.

Perceived Difficulty Level

The first $X^2_L$ analysis dealt with students' opinions regarding the difficulty level of the worksheets. The independent variable was type of worksheet; the categorical dependent variable was "hard" versus "just right" versus "easy." The data are summarized in Table 10.

Table 10. Perception of difficulty level—number of students responding in each response category by treatment group

<table>
<thead>
<tr>
<th>Group</th>
<th>Hard</th>
<th>Just Right</th>
<th>Easy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>10</td>
<td>16</td>
<td>9</td>
</tr>
<tr>
<td>Comprehension</td>
<td>18</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Structuring</td>
<td>17</td>
<td>13</td>
<td>8</td>
</tr>
</tbody>
</table>

$X^2_L = 2.94$

$df = 4$

$p > .50$
The nonsignificant ($p > .50$) $X^2_L$ of 2.94 (df = 4) indicates no significant differences of opinion among treatment groups regarding task difficulty. Therefore, post hoc analyses were not performed.

Perceived Interest Level

The second $X^2_L$ analysis investigated the question of perceived interest level of the various worksheet treatments. The categorical dependent variable was "boring" versus "just right" versus "interesting." The data are summarized in Table 11.

Table 11. Perceived interest level--number of students responding in each response category by treatment group

<table>
<thead>
<tr>
<th>Group</th>
<th>Boring</th>
<th>Just Right</th>
<th>Interesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>3</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>Comprehension</td>
<td>10</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>Structuring</td>
<td>19</td>
<td>2</td>
<td>17</td>
</tr>
</tbody>
</table>

$X^2_L = 14.42$

df = 4

$p < .01$
The finding for interest level was significant ($\chi^2 = 14.42$; df = 4; p < .01). Post hoc collapsing of data for comparison purposes indicated that:

1. Collapsing the "just right" and "interesting" categories provides a more viable model than the original three category response model. That is, the collapsed model is more parsimonious than the original model because more independence has been partialled out.

2. Combining the comprehension and structuring treatment groups presents a better model than the original. That is, the structuring and comprehension groups, together, differ in perception of interest level from the drill group.

Perceived Purpose

The third $\chi^2$ analysis dealt with students' opinions regarding why they had been asked to complete the three-lesson series of worksheets. The categorical response options were "busywork" versus "to help us learn." Response data are presented in Table 12.
Table 12. Perceived purpose of the worksheets—number of students responding in each response category by treatment group

<table>
<thead>
<tr>
<th>Group</th>
<th>Busywork</th>
<th>Facilitate Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>0</td>
<td>35</td>
</tr>
<tr>
<td>Comprehension</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>Structuring</td>
<td>2</td>
<td>36</td>
</tr>
</tbody>
</table>

$x^2_L = 3.82$

The nonsignificant (p > .10) $x^2_L$ of 3.82 (df = 2) indicates no significant differences of perception among treatment groups regarding task purpose. Hence, post hoc analyses were not conducted.

Perceived Usefulness

The final $x^2_L$ analysis concerned students' perception of the worksheets as a useful learning tool. The categorical response options were "helped us learn" versus "did not help us learn." The data used in this analysis appear in Table 13.
Table 13. Perceived usefulness as a learning tool—number of students responding in each response category by treatment group

<table>
<thead>
<tr>
<th>Group</th>
<th>Useful Learning Tool</th>
<th>Not Useful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>Comprehension</td>
<td>41</td>
<td>1</td>
</tr>
<tr>
<td>Structuring</td>
<td>36</td>
<td>2</td>
</tr>
</tbody>
</table>

\[ \chi^2_L = 2.66 \]
\[ df = 2 \]
\[ p > .20 \]

The nonsignificant \((p > .20)\) \(\chi^2_L\) of 2.66 \((df = 2)\) indicates no significant differences of perception among treatment groups regarding usefulness of the worksheets as a learning tool. Post hoc analyses were not performed.
CHAPTER 5

DISCUSSION

Theories and previous research dealing with learning from prose, mathemagenic activity, levels of processing, and incidental learning appear to have implications for the organization of classroom instruction. The greatest percentage of classroom instructional time has been shown to be spent in seatwork activities. Teachers claim that worksheets are a widely used format for seatwork. The thrust of this research has been to determine how the use of specific types of worksheets designed as mathemagenic activities for the promotion of learning from prose affect the type of knowledge acquired.

Achievement

Upon immediate posttesting, high and middle level readers outperformed low level readers on all subscale measures (FN, RI, CN, CI). These results were expected. It seemed reasonable to anticipate that better readers would outperform poorer readers on tasks requiring reading, e.g., completion of worksheets and test taking. Other researchers (e.g., McPeake, 1979; Meyer, 1977; Smiley et al., 1977) have obtained similar findings with regard to ability-performance correlations.

The posttest finding that all groups of students, regardless of treatment or reading level, performed better on items requiring recall
of information previously called for by the drill worksheets (i.e., the RN subscale) is not surprising from a theoretical standpoint. Of the items on the four subscales, items of the RN subscale were designed to tap the lowest level of information processing. Therefore, worksheets designed to promote higher levels of processing (i.e., comprehension and structuring worksheets) should also have facilitated the recall of detailed information processed at lower levels (vide Craik and Lockhart, 1972; Meyer, 1977) by the structuring and comprehension treatment groups. However, item difficulty within subscales may have been a confounding factor. That is, regardless of treatment or reading level, the RN subscale may have contained the easiest test items.

The other significant finding for trials at posttesting was that all students, regardless of treatment or reading level, performed significantly better on the RI and CN subscales than on the CI subscale. From a theoretical point of view, this finding was also to be expected. Items on the CI subscale called for comprehension of concepts not presented on even the comprehension worksheets. The only group that might have been expected to perform relatively well on the CI subscale was the structuring group. The structuring procedure may have, for some individuals, resulted in a higher level of processing than that called for by the comprehension worksheets. Again, item difficulty may have been a confounding factor. The CN subscale may have contained the most difficult test items for all treatment groups within all reading levels.

Follow-up testing also yielded a significant trials effect for the R subscale over the C subscale. If item difficulty was not a
confounding factor, this finding was also to be expected. Of the items on the two subscales, items of the R subscale were designed to tap the lower level of information processing. A purpose of assigning comprehension and structuring worksheets was to encourage processing at a deeper level than that required by the drill worksheets. According to depth of processing models of memory, deep level processing increases retention, including retention of information processed at levels lower than that called for by the orienting task. Hence, students in all treatment groups could be expected to perform relatively well on items calling for recall of detail.

Some previous research (Meyer, 1977) has shown that main ideas and concepts are retained for longer periods of time than is information lower in the structure. Meyer's work, however, was conducted with college students and the dependent measure for retention after one week took a free recall format. It would be interesting to replicate Meyer's study with younger students using both free and cued recall measures.

One finding for the follow-up study, which did not manifest itself at the time of posttesting, was the significant treatment by blocks interaction. Specifically, it was found four weeks posttreatment that high level readers in the drill and comprehension groups performed significantly better than low level readers in the drill and comprehension treatment groups on the C subscale. For some reason, high readers in the structuring treatment group did not maintain their relatively higher performance on the comprehension items over time.
Perhaps while the posttest had presented another episode of cued practice for the drill and comprehension groups, it had been a new experience for the structuring group; hence, the structuring group had less practice with the test format by nature of the worksheets to which they had been exposed. In a review of studies in which types of curriculum materials served as the independent variable, Popham (1969) cited five studies (Gropper, 1968; Johnson, 1968; Melching and Nelson, 1966; Traub, 1966; Williams, 1966) supporting the notion that test performance improves when curriculum materials allow for practice with the test format.

Main effects were not demonstrated for treatment at the time of either posttesting or follow-up testing. One explanation could be that the subscales of the instruments used to measure achievement were not sufficiently reliable to reflect actual differences. Coefficient alphas for the RN, RI, CN, and CI subscales of the achievement posttest were .60, .45, .29, and .44, respectively. Coefficient alphas for the R and C subscales of the follow-up achievement test were .44 and .63, respectively.

Another possible explanation for the nonsignificant differences among groups on measures of achievement could be that the treatment was ineffective. Ineffective treatment effects may be manifested for a variety of reasons, e.g., the treatment was based on faulty theory, the levels of treatment were not different enough from each other, the length of the treatment was insufficient, or confounding variables interfered with the treatment.
The levels of treatment were as different and the duration of treatment as long as seemed pragmatic. It was anticipated that greater treatment duration would confound results by introducing a boredom factor. As many of the threats to internal validity (Campbell and Stanley, 1963) as could be controlled in the naturalistic classroom setting were dealt with via random assignment to treatment groups and consistency of treatment presentation across classrooms.

The issue of theoretical soundness cannot be easily addressed. Rather, the issue seems to become one of the treatment accurately reflecting theoretical tenets. The treatment did consider the nature of learning from prose as well as the implications of depth of processing models of memory.

Smiley et al. (1977) contend that poor readers have difficulty with all types of activities requiring comprehension. It may be that reading ability is, indeed, the best predictor of achievement. It stands to reason that if a student does not easily comprehend, tasks requiring comprehension or higher levels of processing will not prove beneficial. A major implication of the achievement findings in this study is that the instructional needs of low level readers require further investigation. Examination of the raw data reveals that low level readers do better on tasks requiring recall when they have practiced the format via drill or when they have provided their own structure to the material than when they have been asked to comprehend information in the existing or provided structure. These readers perform better on tasks calling for concept comprehension when they have applied their own structure to
the instructional material than when they have engaged in drill activities or activities requiring demonstration of comprehension.

**Allocation and Engagement of Time**

The significant findings for allocated time reveal that students asked to select and write main ideas chose to allow more time to task completion than did students asked to participate in the more structured drill or comprehension activities. It may be that students in the structuring group allocated more time to task completion because the format of their worksheets required the writing of ideas or sentences. It is also possible that the structuring task required more rereading of the textual material than the drill or comprehension tasks.

In addition, it was shown that low level readers chose to allot more time to task completion than high level readers. It is probable that low level readers simply take longer to read given material than high level readers. It also seems possible that low level readers may habitually allow more time for task completion than better readers.

Findings for ELT indicate that although students in the structuring group allotted more time to task completion, only high and middle level readers in the structuring group exhibited greater percentages of ELT than high level readers in the drill group. Despite the finding that low level readers allot more time to task completion than high level readers, it was demonstrated that only low readers in the drill group actually attended to the task for a significantly greater percentage of time than high readers in that group. Finally, the findings
for ELT indicated that all levels of readers in the comprehension group spent more time on task than high readers in the drill group.

The findings for ELT raise several questions. Various researchers (Fisher et al., 1978; Rosenshine and Berliner, 1978; Stallings, 1977) have demonstrated that ELT is positively correlated with achievement and that ELT is often highest for drill-type activities in which students experience high success rates. Research on prose learning has demonstrated that higher level activities, such as those requiring structuring or comprehension, result in greater achievement. The discrepant findings may well be attributable to the variation in dependent measures. Achievement tests typically place heavy emphasis on recognition and recall of details. Research on prose learning has typically used free recall measures.

The present research sought to measure both recall and comprehension. While there were no significant main effects for treatment, the levels by treatments interaction does raise several issues. Although low level readers spent more time than high level readers on drill activities, it does not seem reasonable to expect that low ability readers will perform better than high ability readers on measures of recall.

The finding that high and middle level readers in the structuring group were on-task a greater percentage of time than high level readers in the drill group may be attributed, in part, to the fact that the structuring task required more writing. Appropriateness of task difficulty or interest level may also have been a factor. That is, the
structuring task may have been appropriately difficult or interesting for high and middle level readers. The drill task, however, may not have been of appropriate difficulty or interest for high level readers.

The finding that all readers in the comprehension group attended to the task for a greater percentage of time than high level readers in the drill group might appear to indicate that the comprehension groups would outperform the high level readers in the drill group on measures of achievement. Examination of the raw data reveals that high readers in the comprehension group did outperform high readers in the drill group on the RN and RI subscales of the posttest. These two groups performed equally well on the R subscale of the follow-up test.

It appears that reading ability, particularly comprehension ability, cannot be ignored in any investigation of ELT. It is also imperative that future investigations involve dependent measures of detailed as well as higher level knowledge acquisition, perhaps in both cued and free recall formats.

Treatment Perception

The three nonsignificant findings for perception of the treatment are, perhaps, more interesting than the significant finding. In general, these findings reveal a positive attitude toward the worksheets.

The finding for perceived level of difficulty indicates no significant differences among groups. In other words, students in the drill, comprehension, and structuring groups equally perceived the worksheets to be "hard," "just right," or "easy." Thirty-nine percent
of all respondents indicated that the worksheets were hard; thirty-eight percent indicated the worksheets were of just right difficulty; twenty-three percent indicated the worksheets were easy. Reading level may have proven an informative variable for this analysis.

The finding for the perceived purpose analysis revealed no significant differences among groups. That is, students across drill, comprehension, and structuring groups equally perceived the purpose as being to provide "busywork" or to facilitate learning. Ninety-six percent of the students indicated that the worksheets had been assigned to help them learn. It might be interesting to ask students regarding the perceived purpose of other classroom activities. It is anticipated that young children would say that all school activities help learning.

The finding for perceived usefulness of the worksheets as learning tools was also nonsignificant. Ninety-seven percent of the students said that the worksheets did, in fact, help them learn. Unfortunately, the students were not asked what they learned as a result of using the worksheets.

The finding for interest level was significant. Post hoc analysis revealed that more students said the worksheets were interesting or at an appropriate interest level than said they were boring. Perhaps young students are not easily bored. Hopefully, the planning that went into worksheet construction did facilitate maintenance of interest. It might be interesting to ask these students about the interest level of their regularly assigned worksheets.
The other significant post hoc finding was that the combined comprehension and structuring groups differed in opinion from the drill group with respect to interest level. Thirty-six percent of the students in the comprehension and structuring groups combined said the worksheets were boring. Only nine percent of students in the drill group said the worksheets were boring. Ninety-one percent of the students in the drill group said the worksheets were at an appropriate interest level or interesting. Sixty-four percent of the students in the comprehension and structuring groups said the worksheets were appropriate or interesting rather than boring. Perhaps a higher percentage of students in the drill group found the worksheets interesting because of the variety of activities such as matching or sentence completion included on these worksheets. The comprehension and structuring worksheets generally required the writing of sentences.

In summary, the achievement results of this study demonstrated that:

1. There were no significant differences among treatment groups on the posttest.
2. Regardless of type of worksheet used, high and middle ability readers performed better on posttest measures of achievement.
3. Directly following treatment, students of all reading abilities, regardless of type of worksheet used, performed best on test items requiring recognition or recall of nonincidental information. Subjects also performed better on measures of
incidental recall and nonincidental comprehension than on measures of incidental comprehension.

4. Four weeks following treatment, high and middle ability readers outperformed low ability readers on a measure of recognition and recall regardless of type of worksheet used.

5. Four weeks following treatment, high level readers in the drill and comprehension groups performed significantly better on a measure of comprehension than did low level readers in the drill and comprehension groups.

Examination of the time variables revealed that:

1. Students in the structuring group chose to allot more time to task completion than students in the drill or comprehension groups.

2. Low level readers chose to allot more time to task completion than high level readers.

3. ELT for low level readers in the drill group was greater than for high level readers in the drill group.

4. ELT was greater for high and middle level readers in the structuring group than for high level readers in the drill group.

5. ELT for all readers in the comprehension group was greater than for high level readers in the drill group.

One measure of attitude toward the worksheets demonstrated a significant difference among treatment groups. More students in the
drill group perceived the worksheets to be of an appropriate or high interest level than did students in the structuring and comprehension groups.

The present study suggests that type of worksheet used does not necessarily determine the type of knowledge acquired. Rather, reading ability appears to be a primary variable in whether a student will process information at a level necessary to facilitate both comprehension and recall. If, indeed, students of low reading ability have difficulty comprehending from prose, then provision of mathemagenic activities designed to promote processing at the comprehension level may not be an equitable instructional technique. Further research is necessary to determine which variables are critical to learning from prose for students of varying abilities.
Lesson One: "Machines Take Over"

Time Allotment: 50 minutes total

Materials Required:

For the pupils—Social Studies Textbook
Student Work Folders

For the teacher—Social Studies Textbook
Lesson Script (see below)
Answer Keys for Student Worksheets

Script

(Sections to be read aloud by the teacher to the class are in capital letters.)

THIS WEEK WE WILL BE WORKING ON CHAPTER 21 IN OUR SOCIAL STUDIES BOOK. THE WAY WE STUDY CHAPTER 21 WILL BE A LITTLE DIFFERENT THAN THE WAY WE HAVE STUDIED SOME OTHER LESSONS. I WILL BE KEEPING A FOLDER FOR EACH OF YOU. YOU WILL KEEP ALL OF YOUR WORK FOR CHAPTER 21 IN THIS FOLDER. THE FOLDERS WILL BE PASSED OUT AND THEN RETURNED TO ME AT THE END OF EACH LESSON. NEXT MONDAY YOU WILL HAVE A TEST OVER THE LESSONS STUDIED THIS WEEK.

IN TODAY'S LESSON WE WILL LEARN ABOUT SOME OF THE MACHINES INVENTED AFTER THE CIVIL WAR. MANY OF THESE MACHINES COULD BE CALLED "WORK-SAVERS" BECAUSE THEY HELPED PEOPLE GET MORE WORK DONE FASTER. SOME EXAMPLES OF WORK-SAVING MACHINES WOULD BE TYPEWRITERS, SEWING MACHINES, AND DISHWASHERS. WORK-SAVING MACHINES CHANGED PEOPLE'S LIVES.

NOW, TAKE OUT YOUR SOCIAL STUDIES BOOKS AND TURN TO PAGE 257. FOLLOW ALONG WHILE I READ THE LESSON OUT LOUD. When students are ready, read page 257.

WE WILL SKIP PAGE 258 FOR NOW AND COME BACK TO IT LATER. FOLLOW ALONG WHILE I READ PAGES 259 AND 260 OUT LOUD. Stop reading just before you get to the "Think About It" section on page 260.

NOW TURN BACK TO PAGE 258 WHICH IS ENTITLED "SOME THAT DIDN'T MAKE IT." The teacher should read the first three sentences aloud and then call on a separate child to read, aloud, each of the six picture captions: The Self-Tipping Hat, The Attached Milking Stool, The Leg Hammock, The Personal Fire-Escape, Chicken Glasses, and the Railroad Headrest.

TURN TO PAGE 257. NOTICE THE WORD "INVENT." Hold up book and point. IT MEANS TO MAKE UP SOMETHING NEW. NOW TURN TO PAGE 260. NOTICE THE VOCABULARY WORD, "MONOTONY." Hold up book and point. IT MEANS SAMENESS.
IN JUST A MOMENT I WILL GIVE EACH OF YOU A FOLDER CONTAINING A WORKSHEET ASSIGNMENT. WHEN YOU GET YOUR FOLDER YOU ARE TO OPEN IT AND BEGIN WORKING. IF YOU HAVE QUESTIONS ABOUT YOUR ASSIGNMENT YOU MAY COME UP TO MY DESK AND ASK ME FOR HELP. WHEN YOU FINISH YOUR WORK, PUT IT BACK IN YOUR FOLDER AND PUT THE FOLDER IN THE BASKET (or other designated container) ON MY DESK (or other designated spot). IF YOU FINISH BEFORE THE END OF THE PERIOD (tell them at what time the period will end), READ A BOOK OR FINISH UNFINISHED WORK (or whatever activity the teacher and the experimenter have agreed upon).

Distribute the folders.

At the end of 50 minutes, ask those who have not yet finished to turn in their folders anyway. No work is to be taken home.

Note: It may work better for some teachers to have the folders collected at the end of the period instead of having them placed in a "basket" as they are finished.
Lesson Two: "From Rags to Riches"

Time Allotment: 50 minutes total

Materials Required:

For the pupils—Social Studies Textbook
Student Work Folders

For the teacher—Social Studies Textbook
Lesson Script (see below)
Answer Keys for Student Worksheets

Script

(Sections to be read aloud by the teacher to the class are in capital letters.)

HOW MANY OF YOU HAVE EVER HEARD THE SAYING, "FROM RAGS TO RICHES"? Ask for a show of hands. WELL, THE PHRASE, "FROM RAGS TO RICHES" MEANS TO GO FROM BEING POOR OR HAVING VERY LITTLE MONEY TO BEING RICH OR HAVING MORE THAN ENOUGH MONEY TO TAKE CARE OF YOUR NEEDS. IN TODAY'S LESSON WE WILL LEARN HOW BUSINESSES, AFTER THE CIVIL WAR, HAD THE POWER TO CHANGE PEOPLES' LIVES. MANY PEOPLE WHOSE LIVES WERE CHANGED BY THE GROWTH OF BUSINESSES WENT FROM RAGS TO RICHES.

NOW TAKE OUT YOUR SOCIAL STUDIES BOOKS AND TURN TO PAGE 261. I WILL BE THE NARRATOR AND READ THE ITALICIZED PRINT. Then select three students to read the parts of Tom, Mary, and Richman. PLEASE FOLLOW ALONG WHILE (the three selected students) READ ALOUD THE PLAY ON PAGES 261 AND 262.

When the play has been completed, the teacher should resume reading the lesson aloud to the class. Stop just before the "Think About It" section on the bottom of page 264.

NOTICE THAT WE HAVE SIX VOCABULARY TERMS IN THIS LESSON. THEY ARE "BUSINESS CYCLE, PROSPERITY, RECESSION, DEPRESSION, RECOVERY, AND UNION." EXCEPT FOR THE WORD, "UNION," THE MEANINGS FOR THE VOCABULARY TERMS ARE ON PAGES 262 AND 263. Hold up book and point to each term. "UNION" IS DEFINED ON PAGE 264. Hold up book and point while saying, "A UNION IS A GROUP OF WORKERS WHO JOIN TOGETHER TO PROTECT THEIR INTERESTS."

Before distributing the work folders, say: THE WORKSHEETS FOR LESSON ONE HAVE BEEN CORRECTED AND ARE IN YOUR FOLDERS ALONG WITH A NEW WORKSHEET ASSIGNMENT FOR TODAY'S LESSON. AFTER YOU HAVE LOOKED AT THE CORRECTIONS ON THE ASSIGNMENT FOR LESSON ONE, PUT THEM BACK IN YOUR FOLDER AND BEGIN WORKING ON THE NEW ASSIGNMENT. IF YOU HAVE ANY QUESTIONS ABOUT YOUR WORK, YOU MAY COME UP TO MY DESK FOR HELP. WHEN
YOU FINISH TODAY'S ASSIGNMENT, PUT EVERYTHING, INCLUDING THE CORRECTED WORKSHEET FOR LESSON ONE, BACK IN YOUR FOLDER. THEN PUT YOUR FOLDER IN THE BASKET (or other designated container) ON MY DESK (or other designated spot). IF YOU FINISH BEFORE THE END OF THE PERIOD (tell them at what time the period will end), READ A LIBRARY BOOK OR FINISH UNFINISHED WORK (or whatever activity the teacher and the experimenter have agreed upon).

Distribute the folders.

At the end of 50 minutes, ask those who have not yet finished to turn in their folders anyway. No work is to be taken home.

Note: It may work better for some teachers to have the folders collected at the end of the period instead of having them placed in a "basket" as they are finished.
Lesson Three: "Women Fight for Their Rights"

Time Allotment: 50 minutes total

Materials Required:

For pupils—Social Studies Textbook
Work Folders

For the teacher—Social Studies Textbook
Lesson Script (see below)
Answer Keys for Student Worksheets

Script

(Sections to be read aloud by the teacher to the class are in capital letters.)

ABOUT 100 YEARS AGO, IN THE 1880's, WOMEN'S LIVES WERE A LOT DIFFERENT FROM WHAT THEY ARE NOW. WOMEN WERE NOT ALLOWED TO VOTE AND THEY COULD ONLY WORK AT CERTAIN KINDS OF JOBS. IN TODAY'S LESSON WE WILL LEARN HOW WOMEN BEGAN TO FIGHT FOR BETTER WORKING CONDITIONS AND OTHER RIGHTS.

TAKE OUT YOUR SOCIAL STUDIES BOOKS AND TURN TO PAGE 265. FOLLOW ALONG WHILE I READ THE LESSON OUT LOUD. Read up to the "Think About It" section and stop.

THE WORKSHEETS YOU DID FOR LESSON TWO HAVE BEEN CORRECTED AND ARE IN YOUR FOLDERS. AFTER YOU LOOK OVER YOUR CORRECTED WORKSHEETS, PUT THEM BACK IN YOUR FOLDERS. THEN BEGIN WORKING ON TODAY'S ASSIGNMENT WHICH IS IN YOUR FOLDER. ATTACHED TO TODAY'S WORKSHEETS ARE SOME QUESTIONS ON WHAT YOU THINK ABOUT THE WAY WE DID SOCIAL STUDIES THIS WEEK. BE SURE TO ANSWER THESE QUESTIONS. YOUR ANSWERS WILL HELP ME PLAN HOW TO TEACH BETTER. IF YOU HAVE ANY QUESTIONS, YOU MAY COME UP TO MY DESK AND ASK FOR HELP. WHEN YOU FINISH DOING TODAY'S WORKSHEETS AND ANSWERING THE ATTACHED QUESTIONS, PUT EVERYTHING, INCLUDING THE CORRECTED WORKSHEETS FROM LESSON TWO, BACK IN YOUR FOLDER. THEN PUT YOUR FOLDER IN THE BASKET (or other designated container) ON MY DESK (or other designated spot). IF YOU FINISH BEFORE THE END OF THE PERIOD (tell them at what time the period will end), READ A LIBRARY BOOK OR FINISH UNFINISHED WORK (or whatever activity the teacher and experimenter have agreed upon).

Distribute the folders.

At the end of 50 minutes, ask those who have not yet finished to turn in their folders anyway. No work is to be taken home.
Note: It may work better for some teachers to have the folders collected at the end of the period instead of having them placed in a "basket" as they are finished.
Assessment Session

Time Allotment: 50 minutes total

Materials Required:

For the pupils—Test

For the teacher—Script (see below)

Key for Posttest

Script

(Sections to be read aloud by the teacher to the student are in capital letters.)

I AM GOING TO DISTRIBUTE YOUR WORK FOLDERS WHICH CONTAIN YOUR CORRECTED WORKSHEETS FOR LESSON THREE AND THE TEST. FIRST LOOK OVER YOUR CORRECTED WORKSHEETS FOR LESSON THREE. IF YOU HAVE NO QUESTIONS ABOUT THEM, PUT THE WORKSHEETS BACK IN YOUR FOLDERS AND BEGIN WORKING ON THE TEST. IF YOU DO HAVE QUESTIONS ABOUT LESSON THREE, COME UP TO MY DESK AND ASK ME ABOUT THEM. THEN RETURN TO YOUR DESK, PUT YOUR WORKSHEET IN YOUR FOLDER, AND BEGIN WORKING ON THE TEST. WHEN YOU FINISH YOUR TEST, PUT IT BACK IN YOUR FOLDER AND WORK QUIETLY AT YOUR DESK UNTIL THE END OF THE PERIOD (tell them at what time the period will end). ALL OF THE FOLDERS WILL BE COLLECTED AT THE END OF THE PERIOD.

After 50 minutes say: PLACE YOUR TEST AND THE CORRECTED WORKSHEETS FROM LESSON THREE BACK IN YOUR FOLDER. Then collect the folders being sure to have one for each student. If a few students say they did not have time to finish, say: DON'T WORRY ABOUT IT. I'LL TAKE THAT INTO ACCOUNT.
APPENDIX B

KEYED WORKSHEETS FOR LESSON ONE
Chapter 21—Lesson One: "Machines Take Over"

Directions: Use the words at the bottom of the page to fill in the blanks. The first one is done for you.

1. Invent means to make up something new.


3. (Big businesses) started after the war to make machines and produce energy.

4. Work-saving (machines) made work easier and life more pleasant.

5. Most of the workers in factories came from (farms).

6. After the (Civil War) Americans invented thousands of machines every year.

7. The growing number of (work-saving) machines caused many changes in peoples' lives.

8. Work could be done (faster) with machines.

9. Workers in big (factories) made the steel that was used to make other machines.

10. Factory work was often (monotonous).

Use these words:

- Farms
- Big businesses
- Machines
- Faster
- Monotonous
- Work-saving
- Invent
- Factories
- Civil War
- Sameness
Directions: Use pages 257 through 260 of your Social Studies Book to help you answer the following questions. The first one has been done for you.

1. Where did most factory workers come from?  
   Most factory workers came from farms.

2. What kinds of machines were invented after the Civil War?  
   (Work-saving machines)

3. How did machines save time or cut down on work load?  
   (Machines could do the work of more than one person. OR do work that people could not do at all)

4. What new businesses grew up after the Civil War?  
   (factories; mining)

5. How was factory work different from farm work?  
   (Farm people did many different jobs every day. Factory workers usually did one job over and over again, day after day.)

Write down what time it was when you finished this worksheet:

______________________________
Chapter 21—Lesson One: "Machines Take Over"

Directions: Answer each of the following questions in the space provided.

1. Lots of new machines were invented after the Civil War. The invention of so many machines had some good results and some bad results for people. What do you think were some of the good results?

(Any justifiable response, e.g., time-saving resulting in more leisure time)

What do you think were some of the bad results?

(E.g., people lost their jobs as machines took over; labor problems developed, etc.)

2. Look at the picture on page 259 in your Social Studies Book. How do you think the people in the picture feel about their new machine?

(Any response centering on a feeling, e.g., proud, happy)

How do you think this machine has changed their lives?

(Any justifiable response, e.g., they'll get more work done faster; will need more horses to pull the plow)

3. Read the factory worker's story on page 269 of your Social Studies Book. Do you think the woman who worked in the canning factory was happy with her job?

(Most will say "no") Why or why not? (Any justifiable answer supporting previous response)

4. List some possible advantages of working on a farm.

(E.g., not monotonous; needn't be dependent on others)
List some possible disadvantages of working on a farm.

(E.g., no regular hours; risk of losing crops)

List some possible advantages of working in a factory.

(E.g., regular hours; co-workers)

List some possible disadvantages of working in a factory.

(E.g., tedium; monotony; boredom)

Write down what time it was when you finished this worksheet:
Chapter 21—Lesson One: "Machines Take Over"

1. Write three important or main ideas from page 257 in your Social Studies Book. You may copy sentences from the book or write these ideas in your own words.

1) (Any reasonable ideas)

2) (Any reasonable ideas)

3) (Any reasonable ideas)

2. Write three important or main ideas from page 259 in your Social Studies Book. You may copy sentences from the book or write these ideas in your own words.

1) (Any reasonable ideas)

2) (Any reasonable ideas)

3) (Any reasonable ideas)
3. Write three important or main ideas from page 260 in your Social Studies Book. You may copy sentences from the book or write these ideas in your own words.

1) **Any reasonable ideas**

2) **Any reasonable ideas**

3) **Any reasonable ideas**

Write down what time it was when you finished this worksheet:

______________________________
APPENDIX C

KEYED WORKSHEETS FOR LESSON TWO
Chapter 21—Lesson Two: "From Rags to Riches"

Directions: Match the vocabulary words on the right with the meanings on the left. The first one has been done for you.

1. A time when people are making money and businesses are doing well.  
   a. business cycle
   b. depression
   c. prosperity
   d. recovery
   e. recession
   f. union

2. A group of workers who join together to protect their interests.


4. A time when businesses are doing poorly and many people have no jobs.

5. A time when business is getting better and people are finding jobs.

6. A time when business is getting worse.

Directions: Use pages 261 through 264 of your Social Studies Book to help you answer the following questions. The first one has been done for you.

1. Why did Andrew Richman give Tom a job? Because Richman thought Tom was honest.

2. What idea was very popular in the 1870s and 1880s? (That a young man could go from rags to riches)

3. What was the idea behind the Horatio Alger stories? (Poor boys who get ahead)
4. What are the four parts of the business cycle?

1) (prosperity) 
2) (recession) 
3) (depression) 
4) (recovery) 

5. Why did business cycles develop? (Because everyone depended on everyone else; one person could not control the cycle)

6. What did workers do to get power? (Form unions)

7. What did unions hope to do? (Gain power to work for better conditions, e.g., pay, shorter hours, etc.)

8. In the Horatio Alger stories, what led to the heroes' success? (Hard work, honesty, luck, and/or education)

Write down what time it was when you finished this worksheet?
Chapter 21—Lesson Two: "From Rags to Riches"

Directions: Answer each of the following questions in the space provided.

1. Do you think that what happened in the play on pages 261 and 262 of your Social Studies Book could happen today?
   (Yes or no) ___________ Why or why not? (Any justifiable response supporting previous answer)

2. What do you think about the reward Tom received?
   (Any justifiable response)

3. What do you think Tom's future was like after he took the job?
   (Most will say, "better"—any justified response is acceptable)

4. Which part of the business cycle do you think the United States is in right now? (prosperity, recovery, recession, or depression) Why do you think this? (Any justifiable response--e.g., recession because business is getting worse)

5. How might a depression affect family life? (E.g., families may not be able to afford many things; fathers/mothers might lose jobs)

6. How might a depression affect education? (E.g., people may not be able to afford to send their children to college; kids might have to quit school and go to work)
7. How might a depression affect leisure time? (E.g., people might spend more of their leisure time at home)

8. Look at the picture on page 264 of your Social Studies Book. Do you think what is going on in this picture could have happened in 1860? (Yes or no) Why or why not? (Any justifiable response)

Write down what time it was when you finished this worksheet:
Chapter 21—Lesson Two: "From Rags to Riches"

1. Write three important points or main ideas of the play on pages 261 and 262 in your Social Studies Book.

   1) (Any reasonable ideas)

   2) (Any reasonable ideas)

   3) (Any reasonable ideas)

2. Write four important or main ideas from page 263 in your Social Studies Book. You may copy sentences from the book or write these ideas in your own words.

   1) (Any reasonable ideas)

   2) (Any reasonable ideas)

   3) (Any reasonable ideas)

   4) (Any reasonable ideas)
3. What is the main idea of the paragraph on page 264 in your Social Studies Book?

(Workers formed unions to get power)

Write down what time it was when you finished this worksheet:
APPENDIX D

KEYED WORKSHEETS FOR LESSON THREE
Chapter 21—Lesson Three: "Women Fight for Their Rights"

Directions: For each of the following questions, write either men or women in the blank to make it a true statement. The first one has been done for you.

1. Men________ got the highest paying jobs.
2. (Women)________ were limited in the kinds of work they could do.
3. A good future was promised to __________ who worked very hard.
4. In the late 1800s __________ especially wanted the right to vote.
5. (Men)________ controlled the money that was earned.
6. (Women)________ sometimes sewed clothes in their homes to make money.
7. State laws worked against __________.

Directions: Fill in the blanks. The first one has been done for you.

1. Life for American women greatly changed with the growth of ____________________________ factories
2. Women's groups became much larger after the (Civil)________ War.
3. Women formed groups to ____________________________ (fight for rights)
4. Two women who led the efforts to get women the right to vote were ____________________________ (Elizabeth Cody Stanton)________ and __________ (Susan B. Anthony)
5. Three kinds of jobs that women held in the early 1800s were:
   1) (factory jobs)
   2) (office jobs)
   3) (sewing clothes)

Write down what time it was when you finished this worksheet: __________
Chapter 21—Lesson Three: "Women Fight for Their Rights"

Directions: Answer each of the following questions in the space provided.

1. Look at the picture on page 265 of your Social Studies Book. What are some of the ways that the office in the picture is different from most offices today?

(E.g., old-fashioned machines or typewriters; old-fashioned clothing; crowded working conditions)

2. What are some ways that the office in the picture is like many offices today?

(Answers will vary, e.g., mostly women work there; people are working at desks; women all typing)

3. Women did not begin to openly fight for their rights until after the Civil War. Before the Civil War women did not speak up for their rights. On page 266, one woman uses the words "beating their wings in rebellion." What do you think those words might mean?

(E.g., that women might have had feelings of rebellion when they thought about their lack of rights)
3. In the 1800s women fought very hard for the right to vote. They won that right. Today women are still fighting for rights. One right they are fighting for is to be hired for the same kinds of jobs that men are hired for. Women are also fighting to be paid the same amount of money as men for the same job.

Do you think women today will have an easier time or a harder time getting their rights than women in the 1800s?

(Most will say, "easier")

Why do you think so? (E.g.,)

because this basic right to vote has already been obtained:

women are often members of unions)

Write down what time it was when you finished this worksheet:
Chapter 21--Lesson Three: "Women Fight for Their Rights"

1. Write three important or main ideas from page 265 in your Social Studies Book. You may copy sentences from the book or write these ideas in your own words.

1) (Any reasonable ideas)

2) (Any reasonable ideas)

3) (Any reasonable ideas)

2. Write four important or main ideas from page 266 in your Social Studies Book. You may copy sentences from the book or write these ideas in your own words.

1) (Any reasonable ideas)

2) (Any reasonable ideas)

3) (Any reasonable ideas)

4) (Any reasonable ideas)

Write down what time it was when you finished this worksheet:

________________________________________
APPENDIX E

ATTITUDE QUESTIONNAIRE

Directions: Circle the letter in front of one answer to each question.

1. The worksheets for the lessons in Chapter 21 were:
   a. Way too hard
   b. Sort of hard
   c. Just right
   d. Sort of easy
   e. Way too easy

2. The worksheets were:
   a. Very boring
   b. A little boring
   c. Just right
   d. A little interesting
   e. Very interesting

3. Why were you asked to do the worksheets?
   a. To keep us busy while the teacher did some work
   b. To keep us busy while the teacher helped some students
   c. To help us learn

4. Did the worksheets help you learn?
   a. Yes, a lot
   b. Yes, a little
   c. No, not much
   d. No, not at all

5. What else do you think about the worksheets or how we did Social Studies this week?

__________________________________________________________________________

__________________________________________________________________________
APPENDIX F

ELT CODING FORM

Coding Sheet: Classroom Observations

Observer: ___________________  Teacher: ___________________

Date: ___________________  Time Lesson Began: ________________

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Note: The instructions to the observer for using this form were:

1. Randomly select six children—two having blue worksheets, two having green worksheets, and two having yellow worksheets. Determine the order in which you will observe the six children. Then put a check mark (✓) in the appropriate boxes shown above to indicate the color and clipped corner of each selected child's worksheet.
2. For minute #1 in the grid below:
   a. At 10 seconds after the minute note whether child #1 is on or off task. If on task, mark a plus (+) in row one, column one; otherwise mark a minus (-).
   b. At 20 seconds after the minute note whether child #2 is on or off task. If on task, mark a plus (+) in row one, column one; otherwise mark a minus (-).
   c. Continue in this manner across row one for 30, 40, and 50 seconds after the minute for children #3, 4, and 5, respectively. Note the behavior of child #6 on the minute.

3. Repeat the procedure described in step two for rows two through 15.

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APPENDIX G

KEYED ACHIEVEMENT POSTTEST AND

TABLE OF SPECIFICATIONS
Social Studies Test: Chapter 21

Directions: Match the vocabulary words on the right with the meanings on the left. The first one is done for you.

1. A group of workers who join together to protect their interests.  
   a. invent  
   b. monotony  
   c. union  
   d. recession  
   e. business cycle

2. Ups and downs of business.  
   (a)

3. To make up something new.  
   (a)

4. A time when business is getting worse.  
   (d)

5. Sameness.  
   (b)

Directions: Some of the sentences below are TRUE and some are FALSE. Write true in front of the ones that are true. Write false in front of the ones that are false. The first one is done for you.

true 6. Prosperity was a time when many people had jobs.

(false) 7. In the late 1800s, American factory workers often moved from cities to farms.

(true) 8. In Horatio Alger's books, the hero was always a poor boy who made good.

(true) 9. Workers formed unions to get power.

(true) 10. The invention of work-saving machines brought farmers to the city.

(false) 11. The woman who worked in the canning factory had an hour for eating lunch.

(false) 12. The women who worked in the clothing factories in the 1800s were paid good wages.

(false) 13. During a depression families could easily earn the money to send all children to college.

(true) 14. A reaper was an invention that was used on farms.
15. By 1890 women usually worked in offices with good working conditions. **(true)**

16. Businesses do better during periods of recovery because people save a lot of money. **(false)**

17. One reason that Americans had for making machines was that there was not enough work for everyone. **(false)**

18. During a depression people would probably spend most of their leisure time at home. **(true)**

Directions: Circle the letter in front of the one best answer to each question. The first one is done for you.

19. Who wrote stories about poor young men who became successful?
   a. Susan B. Anthony
   b. Andrew Richman
   c. Horatio Alger
   d. Elias Howe

   **(c)** Horatio Alger

20. What was the main idea of Lesson 1: "Machines Take Over"?
   a. Many machines were invented after the Civil War.
   b. The invention of work-saving machines changed peoples' lives.
   c. People in the United States invented thousands of machines every year.
   d. Work-saving machines made work easier.

   **(b)** The invention of work-saving machines changed peoples' lives.

21. What was the main idea of Lesson 2: "From Rags to Riches"?
   a. Young men can go from rags to riches if they work hard.
   b. Unions are good.
   c. Andrew Richman thought Tom was honest.
   d. Business cycles had the power to change peoples' lives.

   **(d)** Business cycles had the power to change peoples' lives.

22. What was the main idea of Lesson 3: "Women Fight for Their Rights"?
   a. Life for American women greatly changed with the growth of factories.
   b. Some women beat their wings in rebellion.
   c. Women got paid low wages.
   d. Men controlled all the money in the family.

   **(a)** Life for American women greatly changed with the growth of factories.

23. Prosperity might affect families because:
   a. Fathers or mothers might lose their jobs.
   b. Families could earn enough money to buy the things they needed or wanted.
   c. There would not be enough money for all the children to go to college.
   d. Families would not be able to eat out or go the movies very often.

   **(b)** Families could earn enough money to buy the things they needed or wanted.
24. Depression might affect families because:
   (a.) Fathers or mothers might lose their jobs.
   b. Families could earn enough money to buy the things they needed or wanted.
   c. There would not be enough money for all the children to go to college.
   d. Families would not be able to eat out or go to the movies very often.

25. It may be easier for women to fight for their rights today than it was in the 1800s because:
   a. Now there are more women.
   b. Women don't want as many rights as they used to.
   c. Now women have unions to help them.
   (d.) Women now have the right to vote.

26. Farmers could easily sell their crops during:
   (a.) Prosperity
   b. Recession
   c. Depression
   d. Recovery

27. One of the main reasons why factory workers probably became unhappy was:
   a. They missed working on farms.
   b. They didn't have time to spend the money they earned.
   (c.) They had to do the same job over and over.
   d. They were not allowed to eat lunch.

28. In the play about Tom, Mary, and Richman, why did Tom get the job when Mary found the wallet?
   a. Mary was only helping Tom.
   b. Mr. Richman did not trust women.
   c. It was during a depression and there were not enough jobs to go around.
   (d.) People did not think it was as important for women to get ahead as it was for men.

29. A main reason why it may have taken women a long time to win fights for rights is that:
   (a.) They needed the right to vote to help them get other rights.
   b. Men would not let them out of the house to work.
   c. Men controlled all the money.
   d. Some women did not want any rights.
30. One of the best things caused by the invention of machines after the Civil War was that:
   a. People became more proud of their work.
   b. People got to do the same thing over and over.
   (c.) There was more leisure time for workers.
   d. People got to move to the city.

31. When did workers begin to form unions?
   a. Before the Civil War.
   (b.) After the Civil War.
   c. During World War I.
   d. After World War II.

32. Where did the story about Tom, Mary, and Richman take place?
   a. Phoenix
   b. London
   (c.) New York City
   d. Los Angeles

33. In which group of states did women win the right to vote before 1900?
   a. New York, New Jersey, Rhode Island, and Vermont
   b. North Carolina, Virginia, Kentucky, and Louisiana
   c. California, Arizona, Texas, and New Mexico
   (d.) Wyoming, Utah, Colorado, and Idaho

34. Some people think the United States is now in a recession. They might think this because:
   a. Most businesses are doing very well.
   (b.) Businesses seem to be doing somewhat worse.
   c. Many people are losing their jobs.
   d. Things are improving in the business world.

Directions: Write a short answer for each of the questions.

35. List two products miners dug.
   1) (coal)____________________
   2) (iron)____________________

36. Why did women begin to form groups after the Civil War?
   (To fight for rights; to get power)
37. What right did women especially want in the late 1800s?

(The right to vote)

38. Name a group besides women that has had to fight for its rights: (Any reasonable group, e.g., "Blacks") What was a right that this group fought for? (Any justifiable right, e.g., emancipation)

39. Some machines invented around 1900, like the sewing machine, changed the world. Other inventions, like chicken glasses, didn't make it. Why not? (E.g., not needed, not necessary, not desirable; they were strange, unusual, weird, silly, frivolous; they were not time-savers)

40. In the story "From Rags to Riches," how much money did Tom earn in a week?

($12.00)

41. Why did most factory workers eat their lunch quickly and then dance, sing, rest, or talk?

(To relieve boredom; to relax; only opportunity for fun, socializing)

42. Pretend it is 1890 and you are 18 years old. Pretend you want to leave your father's farm and move to the city so you can work in a canning factory. Why might you want to work in the factory? (E.g., good wages; more leisure time)

43. Now pretend it is 1891 and you are 19 years old. Pretend you want to quit your job in the canning factory and move back to your father's farm. Why might you want to leave the factory? (E.g., factory work was boring; tiring; tedious)
Table G1. Table of specifications for achievement posttest: number corresponding to test items by subscale

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APPENDIX H

KEYED FOLLOW-UP TEST AND

TABLE OF SPECIFICATIONS
Follow-Up Activity

Directions: Match the vocabulary words on the right with the meanings on the left. The first one is done for you.

1. A group of workers who join together to protect their interests.
   - A. a. invent
   - B. b. monotony
   - C. c. union
   - D. d. recession
   - E. e. business cycle

2. A time when business is getting worse.
   - A. a. invent
   - B. b. monotony
   - C. c. union
   - D. d. recession
   - E. e. business cycle

3. Sameness.
   - A. a. invent
   - B. b. monotony
   - C. c. union
   - D. d. recession
   - E. e. business cycle

Directions: Some of the sentences below are TRUE and some are FALSE. Write true in front of the ones that are true. Write false in front of the ones that are false. The first one is done for you.

4. Prosperity was a time when many people had jobs.  **true**

5. In the late 1800s, American factory workers often moved from cities to farms.  **false**

6. In Horatio Alger's books, the hero was always a poor boy who made good.  **true**

7. The women who worked in the clothing factories in the 1800s were paid good wages.  **false**

8. One reason that Americans had for making machines was that there was not enough work for everyone.  **false**

Directions: Circle the letter in front of the one best answer to each question. The first one is done for you.

9. Who wrote stories about poor young men who became successful?
   a. Susan B. Anthony
   b. Andrew Richman
   c. Horatio Alger  **c**
   d. Elias Howe
10. What was the main idea of the lesson, "Machines Take Over"?
   a. Many machines were invented after the Civil War.
   b. The invention of work-saving machines changed peoples' lives.
   c. People in the United States invented thousands of machines every year.
   d. Work-saving machines made work easier.

11. Prosperity might affect families because:
   a. Fathers or mothers might lose their jobs.
   b. Families could earn enough money to buy the things they needed or wanted.
   c. There would not be enough money for all the children to go to college.
   d. Families would not be able to eat out or go to the movies very often.

12. Depression might affect families because:
   a. Fathers or mothers might lose their jobs.
   b. Families could earn enough money to buy the things they needed or wanted.
   c. There would not be enough money for all the children to go to college.
   d. Families would not be able to eat out or go to the movies very often.

13. One of the main reasons why factory workers probably became unhappy was:
   a. They missed working on farms.
   b. They didn't have time to spend the money they earned.
   c. They had to do the same job over and over.
   d. They were not allowed to eat lunch.

14. In the play about Tom, Mary, and Richman, why did Tom get the job when Mary found the wallet?
   a. Mary was only helping Tom.
   b. Mr. Richman did not trust women.
   c. It was during a depression and there were not enough jobs to go around.
   d. People did not think it was as important for women to get ahead as it was for men.

15. One of the best things caused by the invention of machines after the Civil War was that:
   a. People became more proud of their work.
   b. People got to do the same thing over and over.
   c. There was more leisure time for workers.
   d. People got to move to the city.
16. When did workers begin to form unions?
   a. Before the Civil War.
   (b.) After the Civil War.
   c. During World War I.
   d. After World War II.

17. In which group of states did women win the right to vote before 1900?
   a. New York, New Jersey, Rhode Island, and Vermont
   b. North Carolina, Virginia, Kentucky, and Louisiana
   c. California, Arizona, Texas, and New Mexico
   (d.) Wyoming, Utah, Colorado, and Idaho

18. Some people think the United States is now in a recession. They might think this because:
   a. Most businesses are doing very well.
   (b.) Businesses seem to be doing somewhat worse.
   c. Many people are losing their jobs.
   d. Things are improving in the business world.

Directions: Write a short answer for each of the questions below.

19. Why did women begin to form groups after the Civil War.
   (To fight for rights; to get power)

20. Name a group besides women that has had to fight for its rights:
   (Any reasonable group, e.g., "Blacks")
   What was a right that this group fought for? (Any justifiable right, e.g., emancipation)

21. Some machines invented around 1900, like the sewing machine, changed the world. Other inventions, like chicken glasses, didn't make it. Why not?
   (E.g., not needed, not necessary, not desirable; they were strange, unusual, weird, silly, frivolous; they were not time-savers)
22. In the story "From Rags to Riches," how much money did Tom earn in a week?

($12.00)

23. Pretend it is 1890 and you are 19 years old. Pretend you want to quit your job in the canning factory and move back to your father's farm. Why might you want to leave the factory?

(E.g., factory work was boring; tiring; tedious)
Table H1. Table of specifications for follow-up test: number corresponding to test items by subscale

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