INCIDENTAL AND INTENTIONAL LEARNING OF ECONOMIC INFORMATION
IN BEGINNING TYPEWRITING

APPROVED:

Graduate Committee:

Don W. Casey
Major Professor

Vernon V. Payne
Minor Professor

Forrest L. Robinson
Committee Member

Eugene M. Allen
Committee Member

Howard H. Smith, Jr.
Dean of the College of Education

Robert B. Toulouse
Dean of the Graduate School

40 W.C.

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In recent years there has been a growing interest in investigating the value of the typewriter as a medium of learning information through the typewriting of content-oriented material. Incidental learning is the acquisition of information that takes place without the subject being instructed to learn the material being typed. Intentional learning is the acquisition of information that takes place as a result of the subject being instructed to learn the material being typed.

The problem in this study was to determine whether students enrolled in beginning typewriting who typed between fifteen and fifty-five words a minute would learn economic facts incidentally and intentionally through the typing of timed writings on the topic of economics. Related problems were to investigate the effect of incidental and intentional learning on typewriting speed and accuracy, and to determine the role of intelligence in the rate of incidental and intentional learning.

Students enrolled in beginning typewriting during the spring term of 1972 in a large, metropolitan, southern, school district served as the subjects. The sample consisted of 104 students who were divided

into two intellectual groups: above average, with an I.Q. of 108 to 137; and below average, with an I.Q. between 60 and 87. These groups were further divided into two learning methods: intentional learning and incidental learning. All students received a pre-treatment administration of the test of economic understandings as well as two five-minute timed writings measuring gross speed and error rate.

The Incidental Learning Group typed twenty five-minute timed writings on the topic of economics over a five-week period. These students were not told that they were participating in a study, and every effort was made to insure that the students were not made aware of this fact. At the end of the five-week period, the students were given a post-test on economics to determine what learning had occurred incidentally through the typing of timed writings. Two five-minute timed writings were also given to determine the progress of the subjects in terms of typewriting speed and accuracy during the experimental period.

The Intentional Learning Group followed the same format as the Incidental Learning Group with the exception that this group was told to read and concentrate on the materials being typed. The students were also told not to sacrifice the speed or accuracy of their typewritten work. They were informed that at the end of the five-week period they would be tested to see how much they had concentrated on the material being typed. The purpose of this procedure was to

determine whether or not students would learn more economic concepts when told to read the copy and to determine what effect reading had on speed and accuracy of typewritten work.

The results of this study indicated that students in the Intentional Learning Group learned significantly more economic concepts than students in the Incidental Learning Group. In addition, it was found that students in the Intentional Learning Group achieved a significantly greater typewriting speed gain at the .05 level than students in the Incidental Learning Group. There were no indications of any significant differences in the rate of accuracy between the two groups. As would be expected, above average learners in both the Incidental and Intentional Learning Groups achieved a significantly greater mean gain on the post-test of economic understandings than below average learners in the two groups.

INCIDENTAL AND INTENTIONAL LEARNING OF ECONOMIC INFORMATION
IN BEGINNING TYPEWRITING

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Linda Tell Dawley, B.S., M.Ed.

Denton, Texas

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CHAPTER I

INTRODUCTION

Two promising avenues of research in typewriting have been in the study of incidental and intentional learning. Incidental learning is learning that takes place without the subject being instructed or motivated to learn the material being typed. Intentional learning is learning that occurs through a conscious effort on the part of the student while typing the material.

Numerous researchers have demonstrated that incidental learning occurs during the typing of material programmed to include factual information on various topics such as law terms, economic concepts, and vocabulary terms (2, 4, 5, 6, 7). In these studies, students were not instructed to learn the materials being typed nor were they informed that they were participating in an experiment. After the end of a designated period of time, the students were then tested on the material that they typed to see if incidental learning had occurred as a result of typing the material. Significant learning resulted from typing especially prepared materials.

Several variables have been investigated in the studies on incidental learning. Hanson (6) indicated that students of high and average intelligence profited more from incidental learning than did students

of low intelligence. No significant difference in learning was found between students of high and average intelligence. A large number of studies concluded that incidental learning had no effect on the speed or the accuracy of typewritten work (3, 4, 6, 7). Clayton (4) concluded that the rate of incidental learning had only a low or nil relationship to such variables as typewriting speed, sex, grade, and age.

A thorough review of the literature to date reveals only one study on the comparison of incidental and intentional learning. Fews (5) conducted a study to compare incidental and intentional learning of vocabulary terms by second-year typewriting students. Her results indicated that students in the Intentional Learning Group learned significantly more vocabulary words than students in the Incidental Learning Group.

There is a need for additional research to study incidental and intentional learning in typewriting. Since speed gain and error rate are very important in the development of typewriting skill, there is a need to investigate the effects of incidental and intentional learning on these two factors. Additionally, there is a need to investigate the relationship of intelligence as a factor in the rate of incidental and intentional learning. Whether subjects of below average intelligence profit more from intentional learning or incidental learning and whether subjects of above average intelligence profit more from intentional or incidental learning are questions which need to be considered.

Statement of the Problem

The problem in this study was to determine whether students enrolled in beginning typewriting who type between fifteen and fifty-five words a minute would learn economic facts incidentally and intentionally through the typing of timed writings on the topic of economics. Related problems were to investigate the effect of incidental and intentional learning on typewriting speed and accuracy, and to determine the role of intelligence in the rate of incidental and intentional learning.

Purposes of the Study

The purposes of this study were to investigate

1. incidental and intentional learning in typewriting,
2. the influence of intelligence as a factor in the rate of incidental and intentional learning in typewriting, and
3. the speed and the accuracy of subjects exposed to incidental and intentional learning in typewriting.

Hypotheses

The hypotheses for this study were as follows:

1. There will be no significant difference on the post-test of economic understandings between the Incidental and Intentional Learning Groups.
2. There will be no significant difference on the post-test of economic understandings between subjects of above average and below average intelligence in the two learning groups.

3. There will be no significant interaction between the Incidental and Intentional Learning Groups on the post-test of economic understandings in students of above average and below average intelligence.

4. There will be no significant difference in speed gains between the Incidental and Intentional Learning Groups on the post-treatment five-minute timed writings.

5. There will be no significant difference in error rate between the Incidental and Intentional Learning Groups on the post-treatment five-minute timed writings.

6. There will be no significant interaction between the Incidental and Intentional Learning Groups on speed gains and error rates in students of above average and below average intelligence.

Definition of Terms

1. Incidental learning is the acquisition of information that takes place without the subject being instructed to learn the material.

2. Intentional learning is the acquisition of information that takes place as a result of the subject being instructed to learn the material.

3. Intelligence is operationally defined in terms of a score on the Otis-Lennon Mental Ability Test (9).

4. Above average intelligence is operationally defined as a score on the Otis-Lennon Mental Ability Test that falls within the upper one-third of the sampling distribution, a score of 108 to 137.

5. Below average intelligence is operationally defined as a score on the Otis-Lennon Mental Ability Test that falls below the lower one-third of the sampling distribution, a score of 60 to 87.
6. Economic information is determined by a score on A Standard Achievement Test in Economic Understandings for Secondary Schools, Sixth Revision, Part I (1).
7. Timed writings are paragraphed materials to be typed by the student within a given period of time.
8. Standard word is five typewritten strokes and is used as a measure to determine words typed a minute.
9. Gross words a minute is the number of standard words typed a minute on a timed writing before subtracting for errors.
10. Errors are deviations of the typewritten copy from the printed copy as determined by the International Contest Rules (8).
11. Statistical significance is defined as being at the .05 level.

Basic Assumptions

It was assumed that there would be no significant difference in interest level on the subject of economics between the two experimental groups.

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CHAPTER II

RELATED RESEARCH

General Studies on Incidental and Intentional Learning

Research pertaining to the effectiveness of intentional learning over incidental learning is contradictory. Several studies (6, 10, 13) have indicated that intentional learning is superior to incidental learning. Other studies (14, 15) indicated that both types of learning are equally effective.

Saltzman (14) studied the importance of the orienting task in incidental learning. He discussed the fact that in most incidental learning studies the subjects are given a task that "does not require the material being presented be learned, though it does require that it be observed" (p. 593). The subjects in the Intentional Learning Group are required to learn the material being presented but are not required to perform the orienting task. In his study, members of both the Incidental and Intentional Learning Groups were given the same orienting task to perform. All subjects were given a deck of thirty-two cards to sort into designated categories as rapidly as possible. After three trials, the members of the Incidental Learning Group were given a seventy-five-second rest period. The members of the Intentional Learning Group were given an unexpected recognition test for the numbers written on the cards. During the next three trials, the Incidental Learning Group proceeded as usual arranging the cards into piles as rapidly as they could.

The Intentional Learning Group was now instructed to learn the cards as they sorted them. On the second three trials, the performance of the two groups differed. Subjects in the Incidental Learning Group showed a greater increase in speed; subjects in the Intentional Learning Group did not increase their speed. Both the Incidental and Intentional Learning Groups were then given a recognition test on the numbers on the cards. The results of the recognition test indicated that the Intentional Learning Group did not achieve significantly higher scores than the Incidental Learning Group. Saltzman concluded from the results of the study that "when the only difference between the two learning conditions is the presence or absence of instructions to learn, we will fail to find a difference in learning scores" (14, p. 596).

Fews (6) studied incidental and intentional learning of vocabulary terms in typewriting. Both the Incidental and Intentional Learning Groups performed the same orienting task, that task being to type the material on vocabulary terms. The only difference between the two groups was the presence or absence of instructions to learn the material being typed. According to Saltzman's view (14), a significant difference between incidental and intentional learning is found in the nature of the orienting task. In Few's study both the Incidental and Intentional Learning Groups performed the same orienting task, typing. Her results failed to support Saltzman (14) in that the Intentional Learning Group scored significantly higher on the post-test of vocabulary terms than did the Incidental Learning Group.

Saltzman and Atkinson (15) studied the effect of the number of presentations of the stimuli on the difference between incidental and intentional learning. All subjects were given a list of four, two-digit numbers. Each group was given a different number of presentations of the list of numbers ranging from two presentations to sixteen presentations. They hypothesized that after only a few presentations of the stimuli there would be no difference between the incidental and intentional learning, but that after many presentations, intentional learning would be superior to incidental learning. The subjects were divided into eight subgroups. Four were defined as Incidental Learning Groups, and four were defined as Intentional Learning Groups. The results of the study indicated that no difference was found between the scores on incidental and intentional learning after only 2, 6, and 8 presentations. After 16 presentations, however, there was a statistical difference in favor of the Intentional Learning Group.

Postman, Adams, and Phillips (13) conducted a study to determine the effects of the associative value and the method of testing on incidental and intentional learning. They hypothesized that the "difference in the amount recalled by intentional and incidental learners would be a function of the associative value of the stimulus items" (13, p. 2). The results of their study indicated that stimuli of high associative value were learned equally well by incidental and intentional learners, whereas items of low associative value were learned better by intentional learners. The difficulty of the retention test was also studied. They hypothesized that neither a very difficult nor a very easy test would

discriminate between incidental and intentional learning. The results of their study indicated that tests of medium difficulty discriminated best between learners, in favor of the intentional learners.

Karen (10) conducted a study using incidental and intentional learners in which both groups were exposed to fifteen nonsense syllables and fifteen three-letter words. Both groups performed the same orienting task of finding words or syllables in a matrix. The results of the study indicated that intentional learning was superior to incidental learning on the recognition of words. The difference between the two groups' performance on the recognition of nonsense syllables was not statistically significant.

Incidental Learning in Typewriting

Templeton (16) conducted one of the earlier studies on incidental learning in typewriting. He was interested in determining whether elementary and junior high school students who were classified as borderline readers would increase their reading and spelling abilities through typewriting. During an eight-week period, the students were taught the basics of typewriting through the use of typewriting materials containing spelling words and vocabulary that were being taught in their reading classes. The results of the study indicated that the students showed greater improvement in reading and spelling than could be attributed to classroom instruction only. Additionally, Templeton noted that "they seemed more interested in school work, they showed increased

ability to detect errors, and they were more aware of reading and spelling deficiencies" (16, p. 231).

Templeton (16) used isolated words and phrases as a means of teaching vocabulary. Baty (2) conducted one of the first studies on incidental learning in which contextual material was used as a means of teaching vocabulary. He divided 456 high school students enrolled in beginning typewriting into three experimental groups. One experimental group was given timed writings to type in which vocabulary terms to be learned were clearly defined in the material. A second experimental group was exposed to timed writings in which the same vocabulary words appeared in the material but were not defined. The third group was designated the control group. These students typed traditional textbook materials. Thirty vocabulary words were presented to the students. On the post-test of vocabulary terms containing the thirty words included in the especially prepared timed writings, the first experimental group gained 8.37 words, the second experimental group gained .76 words, and the control group gained .76 words. The difference in the gains between the first and second experimental groups was significant at the .0005 level. Baty also tested whether there were any significant differences in typing speed gains among the three groups. He found that the control group typed significantly fewer words than did the two experimental groups. The significance of this finding could be that interesting material yields greater concentration and alertness on the part of the

typist. These results support the findings by Bell (3) and McQuade (11) on the favorable effects of interesting copy on typewriting skill.

Clayton (5) conducted a study involving 224 students enrolled in beginning typewriting to determine whether students would learn economic concepts incidentally through the typing of timed writings on the subject of economics. During the forty-five-day experimental period, the students in the Incidental Learning Group typed two five-minute timed writings per day on the subject of economics. The timed writings were presented on three different occasions. The Control Group typed two timed writings per day from their textbook. The results of the study indicated that the Incidental Learning Group achieved significantly greater gains on the post-test of economic understandings than did students in the control group. The results were at the .01 level of significance. In addition, Clayton found that gains in economic understandings were almost entirely independent of I.Q. scores, reading comprehension, and grade levels. Gains in economic understandings when compared to initial economic understandings were of a low or negative nature. Clayton found no significant difference in speed gain and error rate between the two groups.

Tucker (17) conducted a study on second-year typewriting students to determine if business economic concepts could be taught incidentally in the typewriting class. He matched students into pairs on the basis of reading scores, I.Q., sex, and typewriting ability. The students typed warm-up drills which contained phrases or thoughts on economics

during the first ten minutes of each period. The students were then given a series of recall tests throughout the study. Tucker found that students in the Incidental Learning Group learned significantly more material on economics than students in the Control Group. He found no difference between speed and error rates of the two groups. A question should be raised at this point as to whether or not this study tested incidental learning. It was stated that a series of recall tests were given throughout the experimental treatment period. Periodic testing on economic concepts being typed by the student would tend to call his attention to the nature of the material being typed. This, in effect, would appear to make it a study more in the direction of being intentional rather than incidental learning.

Humphrey (8) conducted an experimental study to determine if beginning typewriting students would learn basic economic concepts incidentally while learning the skill of typewriting. He used a matched pairs design in which pairs were matched on the basis of grade in school, ability, sex, typing ability, ethnic group, and similarity of background in business subjects. The results of his study indicated a significant difference at the .01 level in favor of the Incidental Learning Group over the Control Group in terms of scores on a post-test of economics. Of significance was the fact that the two groups did not differ in terms of speed or accuracy of typewritten work. The results support the contention that incidental learning does not interfere with the acquisition of typewriting skills.

Palmer (12) conducted a study to determine if beginning typewriting students could learn business law terms incidentally through typing materials on business law. The students were given a twenty-five item test on business law terms prior to the start of the experimental treatment. The treatment consisted of giving the students twelve paragraphs to type over a four-week period. One paragraph was presented each day, and each paragraph answered two of the questions on the pre-test. The students were not told that they would be retested nor that they were participating in a study. The paragraphs were presented during the final ten minutes of each class period. The statistical results indicated that the Experimental Group mean gain on the post-test was significantly greater than the Control Group's mean gain at the .05 level. On an examination of the students' gross speed gain, no significant difference was found between the two groups.

Bober (4) conducted a study on incidental learning in which students enrolled in first-year typewriting in three Chicago schools were given a series of fifteen timed writings to type on the subject of economics. The students typed one timed writing per day for a period of fifteen consecutive school days. The results of the study indicated that the Experimental Group achieved a significant gain on the post-test at the .05 level over the gain by the control group. Although Bober did not study the relationship between incidental learning and reading ability, he did note that "students who were low in reading ability tended to improve little even after using the drill material when

tested by the post-test. Observation of a number of students' reading achievement scores showed some relationship between poor reading and inability to obtain economic information through the typing drills" (p. 112).

Hanson (8) conducted a study on the incidental learning of economic concepts to determine what effect intelligence played on the rate of incidental learning. She divided her students into three ability groups: low, average, and high. Her results indicated that students of low ability did not achieve significantly greater gains in economic understandings when compared to the control group. Students of high and average ability did achieve significantly greater gains than students in the Control Group. There was no difference in achievement between the high and average groups.

Balcziah (1) conducted a study to determine if students would learn spelling words incidentally through typing them. Of significance in this study was the fact that the Control Group used was not a typewriting class but students enrolled in an English Class. The results of the study indicated that both groups achieved gains in spelling. However, there was no significant difference between the Control and Experimental Group. Students enrolled in typewriting achieved equal gains to students enrolled in English classes.

Fitch (7) conducted a study to determine if students would learn formal grammar incidentally through the typing of grammar exercises. The Experimental Group of 213 students typed materials built around the understanding of formal grammatical usage for ten minutes each day over a period of sixty days. The students were not told the purpose of

the study. The study used two Control Groups. One of the Control groups consisted of 220 juniors who were not enrolled in typewriting. This group was used to determine the normal gains in knowledge of formal grammar during the experimental period. A second Control Group consisted of typing students who typed materials from their textbooks. The results of the study indicated that students who typed the formal grammar exercises did not make greater gains than either of the Control Groups. One explanation of the non-significant results was offered by Few (6). She indicated that isolated sentences were used in this study; contextual material related to the experiences of the students would have been more appropriate. Also, motivation should be considered. That is, are rules of grammar interesting to students? Another explanation for the non-significant results could be the type of learning involved in this study. Prior studies have dealt basically with recognition learning of factual materials. This study attempted to determine if students would be able to apply rules of formal grammar after being exposed to the rules through typewritten materials. It may be that incidental learning in typewriting can be successfully used as a vehicle of learning factual materials whereas it may not be applicable to other types of learning, including the application of rules of formal grammar.

Intentional Learning in Typewriting

Few (6) conducted a study analyzing intentional and incidental learning of technical business vocabulary terms in second-year typing.

Specifically, the researcher was interested in determining if added learning would occur when students were told the purpose of the study, thereby making learning intentional. The subjects were divided into three groups: (1) Incidental, (2) Intentional, and (3) Control. The study consisted of 227 students enrolled in 11 different typing classes. The sample consisted of 204 girls and 23 boys. Prior to the experimental treatment, all students were given a pre-test on business terminology. As a result of this testing, thirty terms missed by 55 per cent or more of the subjects were selected to be included in the treatment. Paragraphs were then constructed in the form of timed writings in which these thirty terms were defined.

The Intentional and Incidental Learning Groups typed two paragraphs a day during the first five minutes of each class period during the six-week experimental period. Each paragraph contained a business word defined in context. The Control Group typed materials from their textbook during this same period of time. Ten of the paragraphs were presented to the students on one occasion only, ten were presented twice, and ten were presented on three different occasions.

The Intentional Learning Group was given written instructions to learn the materials being typed. They were not told that they would be retested. The incidental learners were presented the materials to be typed with no explanation as to the content of the materials to be typed. The Control Group followed normal classwork procedures.

The results of the study indicated that students in the Intentional Learning Group learned significantly more business terms than the students in the Incidental Learning Group at the .05 level. The Incidental Learning Group also achieved a significantly greater mean gain on the post-test than did the control subjects. In reference to the number of presentations of the terms, it was determined that words presented on two different occasions yielded greater learning at the .05 level than words presented on one occasion only. No difference was found between two and three presentations.

At the conclusion of the study, the students were given a job production test which included manuscripts, business letters, and tables. The results indicated no significant difference in job production skills among the three groups.

Significance of the Present Study

There are several areas in the study of incidental and intentional learning in typewriting that warrant further research.

Fews' (6) study was conducted on second-year typewriting students. Second-year typing students have mastered the mechanics of typewriting and have automated the key striking motions. Thus, the students in Fews' study were able to maintain a multiple set. They were able to perform the mechanics of typewriting while at the same time learning the material that they typed.

The present study was conducted on first-year typewriting students who typed between fifteen and fifty-five words a minute. First-year

students have not automated the key-striking movements, nor have they mastered the mechanics of the typewriter. This study investigated whether students who typed between fifteen and fifty-five words a minute were able to learn intentionally the materials being typed while not sacrificing the speed or the accuracy of their typewritten work.

Numerous studies (2, 5, 7, 8) indicated that incidental learning does not cause a decrement in the speed or accuracy of typewritten work. Few (6) did not study the effect of incidental and intentional learning on typewriting speed and accuracy as measured by five-minute timed writings. As was stated previously, in the Saltzman (14) study, subjects who were told to learn the numbers on the cards being sorted did not increase their speed equal to subjects who were not told to learn the numbers. The present study examined the effects of intentional learning on typewriting speed and accuracy.

Hanson (8) investigated the role of intelligence in incidental learning. Students of high and average ability profited more from incidental learning than did students of low ability. This study studied the role of intelligence on both incidental and intentional learning. Specifically, this study tested which type of learning is more efficient for above average and below average learners.

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CHAPTER III

PROCEDURES AND DESCRIPTION OF THE INSTRUMENT

Source and Selection of Subjects

The population for this study consisted of students enrolled in beginning typewriting who typed between fifteen and fifty-five words a minute in four selected high schools in a large southern school district during the Spring Term of 1972. The four schools were chosen from among those schools in the district in which one teacher taught at least two sections of Typewriting I and who agreed to participate in the study. Through the process of random selection, one class in each school was named the Incidental Learning Group and one class was named the Intentional Learning Group. A total of eight classes in the four schools participated in the study.

All students in the eight classes were given the following measures prior to the start of the experimental treatment.

1. A Standard Achievement Test in Economic Understandings for Secondary Schools, Part I, Sixth Revision (1)
2. Otis-Lennon Mental Ability Test (5)
3. Two five-minute timed writings (6)

From the results of the administration of Part I of A standard Achievement Test in Economic Understandings for Secondary Schools, Sixth Revision, the twenty items that the students most frequently missed were determined. The students' scores on these twenty items

were used as the covariate. The post-test criteria consisted of the administration of Part I of the economics test. Part I of A Standard Achievement Test in Economic Understandings for Secondary Schools, Sixth Revision is included in Appendix A. The twenty most frequently missed items by the students are indicated with asterisks. Timed writings that cover the subject matter of these twenty items were then selected to be included in the experimental treatment (Appendix B). It was this material that all subjects typed during the five-week experimental period.

The Otis-Lennon Mental Ability Test was used as a basis for stratifying the sample to be included in the study. There were 156 students enrolled in the eight beginning typewriting classes. The Otis-Lennon Mental Ability Test was administered to all subjects. From the results of this administration, the students were divided into three intellectual groups: (1) above average, an I.Q. score of 108 to 137, (2) average, an I.Q. score of 88 to 107, and (3) below average, an I.Q. score of 60 to 87. The sample chosen for investigation in this study was all students whose I.Q. scores fell within the above average and below average ranges. Those students whose scores fell within the middle range also participated in all aspects of the study. Their scores, however, were not included in the statistical analysis of the data.

Two five-minute timed writings were selected from the students' textbook (6) and were given to the two groups prior to the onset of the experimental treatment to determine speed and accuracy rates. Only those students who typed between fifteen and fifty-five words a minute were

included in the study. Of the 104 students who fell within the above and below average range of intelligence, all students typed within the given speed range. The speed and error rates administered prior to the experimental treatment were used as covariates.

Description of the Sample

The sample consisted of the 104 students in the eight classes who met the previously described criteria for inclusion in the study. Table I, below, presents a description of the number of students in terms of intelligence groupings and assignment to experimental treatments.

TABLE I
INTELLIGENCE AND TREATMENT GROUPINGS

	Above Average Intelligence	Below Average Intelligence	Total
Incidental Learning	25	26	51
Intentional Learning	27	26	53
Total	52	52	104

The sample consisted of thirty-three males and seventy-one females between the ages of fifteen and twenty. Mean age for boys was 16.6, while the mean age for girls was 16.1. Sixteen students were enrolled in the tenth grade, fifty-one students were in the eleventh grade, and thirty-seven students were in the twelfth grade. Of the total number of subjects, ninety-two had never taken a formal course in economics, while twelve

students indicated that they were enrolled in or had previously completed at least one course in economics. Seventy-four students in the sample indicated that they planned to attend college while the remaining thirty students named various other post-high school plans.

The teachers involved in this study were fairly similar in terms of years of experience, educational background, and related factors.

Instruments

A Standard Achievement Test in Economic Understandings for Secondary Schools, Part I, Sixth Revision was developed by E. C. Alft in cooperation with the Illinois Council on Economic Education. A Standard Achievement Test in Economic Understandings for Secondary Schools is a multiple choice test containing sixty-five questions which cover a broad range of topics on economics. Administration time is approximately forty-five minutes. Test validity was determined by eight economists from business, labor, agriculture, the Federal Reserve Bank of Chicago, and representatives from the academic community. Reliability data for the Sixth Revision of the test was obtained from testing 6,300 public high school seniors in Hawaii in 1959. The mean score for the test was 20.05 and the median was 29.57. The standard deviation was 8.90. The reliability coefficient of .796 was determined by using the Kuder-Richardson Formula 21(4). Clayton (2) tested 357 students in Oklahoma in 1960 and obtained reliability data using the Kuder-Richardson Formula 21 of .704.

The original test contained one-hundred questions. Several hundred students were administered this original test and, as a result of

revisions carried out by the testing department of Northwestern University, Evanston, Illinois, the test was reduced to the present sixty-five items.

A sample question from the test is presented below.

Question 1. Most American workmen receive higher wages than most foreign workmen chiefly because:

- A. Americans work harder for longer hours
- B. Americans produce more goods per hour than foreign workers
- C. Labor unions do not exist in foreign countries
- D. American workmen are protected by a high protective tariff.

The answer is B.

The Otis-Lennon Mental Ability Test is a widely used group intelligence test. It was developed by Arthur S. Otis and Roger T. Lennon. The working time for the student is forty-five minutes. The single score represents the student's performance on a wide variety of test materials designed to assess general ability. The Advanced Level is recommended for use with students in grades ten through twelve. The test consists of eighty items. Two parallel forms of the test are available. The national standardization procedure was designed to yield a stratified random-cluster sample of pupils representative of U. S. school pupils enrolled in grades K-12. The sample consisted of 0.4 per cent of the total school population. Approximately 200,000 students in 114 school systems drawn from 50 states participated in the various phases of the national standardization program. Approximately 12,000 students per grade were tested in grades K-12 during October and November, 1966.

The reliability data was determined on the basis of correlated split-half correlations, the Kuder-Richardson, and alternate-forms procedures. Standard errors of measurement were based on alternative-form reliability coefficients. Split-half reliability coefficients for grades ten, eleven, and twelve ranged from .94 to .95. Reliability data for age levels for students between the ages of fourteen through seventeen indicated a split-half and Kuder-Richardson reliability coefficients that ranged from .94 through .96 for the three age levels. Alternate forms reliability by age levels for ages fifteen, sixteen, and seventeen yielded correlations between .92 and .93.

The Timed Writings on Economic Understandings, by Clayton (2), on the subject of economics, were developed from the concepts covered on A Standard Achievement Test in Economic Understandings for Secondary Schools, Part I, Sixth Revision (1). A readability index for the timed writings was computed to be between the seventh and tenth grade levels (3). The timed writings contained from 500 to 600 strokes and between 100 and 120 standard words. The syllabic intensity of the timed writings was between 1.2 and 1.4.

An example of the timed writings is as follows:

More Income Through Increased Production

Most workmen in the U. S. receive higher incomes than do workers in other countries. A main reason for this is the production rate of the U. S. worker due not only to his training but also the machines with which he works. With the making of more goods per hour by U. S.

workmen, more goods are made to be sold. This means more income for the U. S. worker. In doing this, U. S. workers do not work longer hours, nor do they depend on a higher protective tariff than do foreign workers. Neither are workers in the U. S. the only ones who are members of labor unions, for such unions are found in other countries.

Pre-and Post-Measurement Timed Writings given to the students prior to and at the completion of the experimental treatment to determine their speed and accuracy rates were taken from the students' text (6). These five-minute timed writings were used to determine the progress made by the students during the experimental treatment period.

Experimental Treatment

The Incidental Learning Group typed prepared timed writings on economic understandings covering the twenty most frequently missed items on the pre-treatment administration of A Standard Achievement Test in Economic Understandings for Secondary Schools, Part I, Sixth Revision during approximately the first fifteen minutes of each Tuesday and Thursday during the five weeks of experimental treatment. No mention was made to the students that they were participating in an experiment nor was their attention called to the subject matter of the typewritten materials. When students questioned why they were typing the timed writings, they were informed that these timed writings were being used as supplements to their textbook.

The Intentional Learning Group typed the same material and followed the same procedures as the Incidental Learning Group with the exception that they were instructed to read and learn the material as they typed it. They were also instructed not to sacrifice the speed or the accuracy of their typewritten work. The students were told that they would be retested at the end of a five-week period to see how much they learned through typing the material. Their regular typing teacher administered the timed writings as part of their everyday activity. The exact instructions given to the students are included in Appendix C.

Measurement Criteria

At the end of the five-week period, the Incidental and Intentional Learning Groups were given two five-minute timed writings to type from their textbooks. The results of these timed writings were used to compare the progress the students had made in typewriting during the five-week experimental period. The five-minute timed writings given prior to the start of the experimental treatment were compared to the writings given at the completion of the experimental treatment to determine if there were any significant differences between and within groups in reference to speed gains and error rates.

Part I of A Standard Achievement Test in Economic Understandings for Secondary Schools, Sixth Revision, was again administered to the

two groups. The subjects scores on the twenty most frequently missed items were used to determine if there were any significant differences between the two groups in their learning of economic information. A two-by-two analysis of covariance procedure was used to determine if there were any statistical differences between the two groups. The pre-test scores on the twenty most frequently missed items by the subjects were used as the covariate.

Subjects grouped in terms of intelligence in the upper one-third of the distribution, or the above average learners, were compared to the subjects in the lower one-third of the sample, or the below average learners, to see if there were any significant interactions in reference to economic information and the speed and accuracy of typewritten work.

Procedure for Analyzing the Data

The statistical procedure used was a two-by-two analysis of covariance. The subjects' pre-test scores on the twenty most frequently missed items on the test of economic understandings and the speed and error rates on the timed writings given prior to the start of the experimental treatment were used as the covariates. The criteria measurements were the post-test on economic understandings and the timed writings measuring speed and accuracy given after the completion of the experimental treatment.

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CHAPTER IV

RESULTS AND DISCUSSION

Results

This study investigated gross typewriting speed, error rate, and learning of economic information under the conditions of incidental and intentional learning during the typing of content oriented material. In regard to these factors, the following questions were asked:

1. Would there be any significant difference between the Incidental and Intentional Learning Groups?
2. Would there be any significant difference between subjects of above average intelligence and below average intelligence?
3. Would there be any significant interactions between the two learning approaches and intelligence groups?

Economic Information

Economic information was measured by the subjects' performance on A Standard Achievement Test in Economic Understandings for Secondary Schools, Part I, Sixth Revision. Prior to the experimental treatment, Part I of this test was administered to the subjects. From the results of this administration, the twenty most frequently missed items were selected. Table II lists the results of this administration.

TABLE II

PRE-TEST MEANS ON THE TWENTY MOST FREQUENTLY MISSED ITEMS ON
A STANDARD ACHIEVEMENT TEST IN ECONOMIC UNDERSTANDINGS
FOR SECONDARY SCHOOLS, PART I, SIXTH REVISION

Method of Learning	Above Average Intelligence	Below Average Intelligence	Row
Incidental	6.64	4.38	5.49
Intentional	5.56	4.35	4.96
Column	6.08	4.36	5.22

Following treatment, Part I of the test on economic understandings was again administered. For the purpose of statistical analysis only the twenty previously determined most frequently missed items were selected for analysis. Table III lists the subjects' performance on the post-test administration of A Standard Achievement Test in Economic Understandings for Secondary Schools, Part I, Sixth Revision.

TABLE III

POST-TEST MEANS ON THE TWENTY MOST FREQUENTLY MISSED ITEMS ON
A STANDARD ACHIEVEMENT TEST IN ECONOMIC UNDERSTANDINGS FOR
SECONDARY SCHOOLS, PART I, SIXTH REVISION

Method of Learning	Above Average Intelligence	Below Average Intelligence	Row
Incidental	8.36	4.08	6.18
Intentional	11.04	7.15	9.13
Column	9.75	5.62	7.68

A comparison of mean differences on the pre- and post-administration of the economics test as seen in Tables II and III indicates that the Incidental Learning Group's mean increase was .68 answers as compared to the Intentional Learning Group's mean increase of 4.17 answers. Above average learners in the Incidental and Intentional Learning Groups achieved a mean gain of 2.67 answers, while the below average learners in the two groups increased their scores by 1.25 answers. The statistical analysis used to investigate the difference between the groups on the post-test of economic understandings was a two-by-two analysis of covariance. Table IV lists the results of the analysis.

TABLE IV

ANALYSIS OF COVARIANCE ON THE POST-TEST OF A STANDARD
ACHIEVEMENT TEST IN ECONOMIC UNDERSTANDINGS FOR
SECONDARY SCHOOLS, PART I, SIXTH REVISION

Source	SS	DF	MS	F	P
Learning Methods	265.72	1	265.72	60.98	0.001
Intelligence	214.55	1	214.55	49.24	0.001
Interactions	0.35	1	0.35	0.08	0.78
Within	431.38	99	4.36		

In answer to question one, concerning whether there would be a significant difference between the Incidental and Intentional Learning Groups on the post-test of economic understandings, an analysis of the data in Table IV indicates that the students' adjusted group mean in

the Intentional Learning Group was significantly higher beyond the .001 level than the adjusted group means of the students in the Incidental Learning Group.

In answer to question two, concerning whether or not there would be any significant difference between the students' adjusted group means of above and below average intelligence on the post-test criteria, an analysis of the data indicates a significant difference at the .001 level in favor of the subjects in the above average intelligence group.

An analysis to determine if there were any significant interactions between the Incidental and Intentional Learning Groups on the post-test of economic understandings in students of high and low intelligence shows a P of .78, which is not significant. The question concerning interactions on the post-test of economic understandings was answered negatively.

Gross Typewriting Speed

Prior to the experimental treatment, gross typewriting speed was measured by the subjects' performance on two five-minute timed writings taken from the students' text (8). The subjects selected the better of the two timed writings. This timed writing was used to determine their gross speed prior to treatment. Table V lists the subjects' mean gross typewriting speed.

TABLE V
MEAN GROSS TYPEWRITING SPEED PRIOR TO TREATMENT
ON A FIVE-MINUTE TIMED WRITING

Method of Learning	Above Average Intelligence	Below Average Intelligence	Row
Incidental	32.80	28.62	30.67
Intentional	33.74	28.50	31.17
Column	33.29	28.56	30.92

Following treatment, the subjects again were given two five-minute timed writings from the same text to measure their post-treatment gross speed. They were again asked to select the better of the two writings. Table VI lists these results.

TABLE VI
MEAN GROSS TYPEWRITING SPEED FOLLOWING TREATMENT
ON A FIVE-MINUTE TIMED WRITING

Method of Learning	Above Average Intelligence	Below Average Intelligence	Row
Incidental	34.44	30.15	32.25
Intentional	37.89	31.62	34.81
Column	36.23	30.88	33.56

A comparison of mean differences on the pre- and post-administration of the timed writings as seen in Tables V and VI indicates that the

Incidental Learning Group increased their mean gross words a minute by 1.59 as compared to the Intentional Learning Group's mean increase of 3.64 words a minute. Above average learners in the Incidental and Intentional Learning Groups achieved a mean gain of 2.94 words a minute, whereas the below average learners in the two groups increased by 2.33 words a minute. A two-by-two analysis of covariance procedure was employed to measure the group differences in gross speed. Table VII lists the results of this analysis.

TABLE VII

ANALYSIS OF COVARIANCE OF THE MEAN GROSS WORDS A MINUTE
OBTAINED BY THE SUBJECTS ON A FIVE-MINUTE
TIMED WRITING FOLLOWING TREATMENT

Source	SS	DF	MS	F	P
Learning Methods	113.89	1	113.89	4.64	0.03
Intelligence	32.01	1	32.01	1.30	0.26
Interactions	7.35	1	7.35	0.30	0.59
Within	2428.71	99	24.53		

In answer to question one concerning whether there would be any significant differences between the Incidental and Intentional Learning Groups on adjusted group mean typewriting speed as measured by five-minute timed writings following treatment, an analysis of the data indicates that the Intentional Learning Group typed significantly faster than the Incidental Learning Group, at the .03 level.

In answer to question two, there was no significant difference between the subjects of above average and below average intelligence in terms of typewriting speed. The obtained P was at the 0.26 level, which was not significant.

In regard to question three, concerning interactions between learning groups and intelligence, the P of 0.59 indicated that there were no significant interactions.

Typewriting Errors

Pre-treatment error rates were determined by counting the total number of errors typed by the subjects on the same five-minute timed writing measuring their gross speed. These results are listed in Table VIII below.

TABLE VIII
MEAN TYPEWRITING ERROR RATE PRIOR TO TREATMENT
ON A FIVE-MINUTE TIMED WRITING

Method of Learning	Above Average Intelligence	Below Average Intelligence	Row
Incidental	8.60	7.81	8.20
Intentional	8.30	6.85	7.58
Column	8.44	7.33	7.88

The same procedure used in establishing pre-treatment error rate was used in determining post-treatment error rate. Table IX lists this information.

TABLE IX
MEAN TYPEWRITING ERROR RATE FOLLOWING TREATMENT
ON A FIVE-MINUTE TIMED WRITING

Method of Learning	Above Average Intelligence	Below Average Intelligence	Row
Incidental	6.64	6.08	6.35
Intentional	7.15	6.27	6.72
Column	6.90	6.17	6.54

A comparison of Tables VIII and IX indicates that the Incidental Learning Group typed a mean of 1.84 fewer errors between the pre- and post-administrations of the timed writings, whereas the Intentional Learning Group decreased their mean error rate by .77 words. Above average learners in the Incidental and Intentional Learning Groups typed a mean of 1.54 fewer errors on the post-test timed writings, while the below average intelligence group typed a mean of 1.15 fewer errors. Through the use of a two-by-two analysis of covariance procedure, group differences on error rate were assessed. This data is listed in Table X.

TABLE X
ANALYSIS OF COVARIANCE OF THE MEAN ERROR RATE
OBTAINED BY THE SUBJECTS ON A FIVE-MINUTE
TIMED WRITING FOLLOWING TREATMENT

Source	SS	DF	MS	F	P
Learning Methods	13.00	1	13.00	0.94	0.34
Intelligence	0.19	1	0.19	0.01	0.91
Interactions	0.02	1	0.02	0.00	0.97
Within	1372.09	99	13.86		

In answer to the three questions discussed in the beginning of the Chapter concerning differences between methods of learning, intelligence groups, and interactions between groups, analyses of the data failed to indicate any significant differences.

Evaluation of the Hypotheses

Hypothesis number one stated that there would be no significant difference on the post-test of economic understandings between the Incidental and Intentional Learning Groups. The results of the statistical analysis of the data rejected this hypothesis beyond the .001 level. There was a highly significant difference between incidental and intentional learning in favor of intentional learning.

Hypothesis number two stated that there would be no significant difference on the post-test of economic understandings between subjects of above average and below average intelligence in the two learning groups. The results of the data rejected this hypothesis beyond the .001 level, in favor of the above average intelligence group.

Hypothesis number three stated that there would be no significant interactions between the Incidental and Intentional Learning Groups on the post-test of economic understandings in students of above average and below average intelligence. On the basis of the analysis of the data the hypothesis could not be rejected.

Hypothesis number four stated that there would be no significant difference in speed gains between the Incidental and Intentional Learning Groups on the post-test five-minute timed writings. The statistical analysis of the data rejected this hypothesis at the .03 level. Subjects in the Intentional Learning Group gained significantly more gross words a minute than subjects in the Incidental Learning Group.

Hypothesis number five stated that there would be no significant difference in error rate between the Incidental and Intentional Learning Groups on the post-treatment five-minute timed writings. The analysis of the data supported this hypothesis.

Hypothesis number six stated that there would be no significant interaction between the Incidental and Intentional Learning Groups on speed gains and error rates in students of above average and below average intelligence. The analysis of the data supported the hypothesis.

Discussion

The results of this study were in agreement with those obtained in an earlier study by Few (4): intentional learning of factual material in typewriting is superior to incidental learning. Few's study was concerned with the learning of vocabulary terms. The present study dealt with the learning of facts on economics. The present study differed from Few's study in that the factors of intelligence and typewriting speed and error rate were also studied.

Studies on incidental learning indicated that students of high or average intelligence (6) profited more from incidental learning than students of low intelligence. The results of this study indicated that students of above average intelligence in the Incidental Learning Group, as well as above average subjects in the Intentional Learning Group, achieved significantly higher scores on the post-test of economic understandings than did the below average learners. In addition, however, above and below average subjects in the Intentional Learning Group achieved significantly higher mean scores on the post-test of economic understandings than did the above and below average incidental learners.

Few (4) studied the effect of incidental and intentional learning on typewritten production work. At the conclusion of her study, she administered a series of typewriting jobs including manuscripts, letters, and tables. The Incidental and Intentional Learning Groups did not differ on their production work. In the present study, the effects

of incidental and intentional learning on the subjects' typewriting speed and error rate on five-minute timed writings were studied. Earlier studies indicated that incidental learning had no effect (2, 3, 6, 7) or a favorable effect (1) on the speed and accuracy of typewritten work. This study investigated the effect intentional learning had on the speed and accuracy of typewritten work. Specifically, attention was directed toward investigating what effect reading and comprehending the material would have on the students' accuracy and speed rates. The results indicated that students in the Intentional Learning Group achieved significantly greater gains in gross speed at the .03 level than did students in the Incidental Learning Group. There was no difference in accuracy rates between the two groups. These results indicated that reading and comprehension of materials by the Intentional Learning Group not only did not hinder but, indeed, increased their speed rates when the typists were compared with those in the Incidental Learning Group. The limited number of students in this study would preclude a generalization to the effect that intentional learning in typewriting will increase the student's speed. Additional research needs to be conducted to either support or refute these results.

The effects of attention and suggestion may well have operated in the study. The fact that the students were aware that they were participating in an experiment may have caused them to work harder for speed and accuracy so as to insure the success of the study. The

additional motivation of being retested at the conclusion of the study may also have been a factor in the results. Students in the Incidental Learning Group whose attention was not called to the nature of the material being typed, typed significantly fewer words than students in the Intentional Learning Group. It may well be that in order for students to benefit maximally in both learning content and to improve their typewriting skill, their attention must be called to the nature of the material being typed.

Fews (4) tested the learning of business vocabulary terms. This study also tested a similar recognition, rote learning. It should be determined through further study if higher levels of learning would be accomplished through this type of learning. In Fitch's study (5), he found that students were not able to apply rules of formal grammar after being exposed to the rules through typewritten materials. It may be that incidental and intentional learning in typewriting may be successfully used as a vehicle of learning factual material, whereas it may not be useful in other types of learning, including the application of rules.

Once sufficient research has been generated to determine the types of learning that can be accomplished through typewriting, it would seem that the next step would be to program typewriting textbooks to include various spheres of knowledge, in which it is thought that the students would benefit. Students could be tested to determine

weaknesses in various subject areas and then be given individualized typewriting assignments to help bridge these gaps in their backgrounds. A class of students could be given the same jobs to type, but containing¹ different content. Although this would be a major undertaking, the benefits accrued by the students would be worth the effort.

This study and the earlier studies on incidental (1, 2, 3, 6, 7) and intentional (4) learning presented the learning materials in the form of typewriting timed writings or straight copy material to be typed once under a certain, designated period of time. In typewriting, the timed writing and straight copy material are only one of many learning tools. Of equal or greater importance, is the ability of the student to do production typing. Production typing includes the ability of the student to type from rough draft material in both written and typewritten form; the ability to set up letters, tables, and forms; and the ability to type manuscripts and other typewritten assignments. Further research should be directed toward determining whether students can learn factual material through these other mediums in typewriting. These studies must, however, investigate the effect such learning has on the student's ability to type. Additional possibilities would also be to conduct research combining the teaching of various courses such as American history, business law, etc., in the typewriting course. Investigators have experimented in this direction; however, these studies have not included a control of variables through

statistical or research design. Such a study would seem to be indicated.

The studies on incidental and intentional learning of contextual material in typewriting have used typewriting classes as control groups. Additional research should be directed in which a non-typewriting class is used as a control. The learning of factual material in the typewriting class should be compared to learning of factual material utilizing the lecture method and other methods of presentation normally found in academic classrooms. A study of this type would necessitate a rigorous control of variables.

A weakness of the present study was the failure to include a follow-up. Students in the Intentional Learning Group achieved significantly greater gains on the post-test of economics than did students in the Incidental Learning Group. The Intentional learners also gained significantly more words per minute than the incidental learners. Would this group have maintained its advantage in these two areas over a period of time? Further research studies should include a follow-up to study these factors.

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CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

In recent years there has been a growing interest in investigating the value of the typewriter as a medium of learning information through the typewriting of content-oriented material. Incidental learning is learning that takes place without the subject being instructed or motivated to learn the material being typed. The results of these studies (1, 2, 4, 5, 6, 7) overwhelmingly pointed to the fact that students learned factual materials that they typed even when not instructed to learn the materials. A recent study by Few (3) attempted to ascertain whether additional learning would occur when attention was called to the nature of the material being typed. Intentional learning is learning that occurs through a conscious effort on the part of the student while typing the material. This study indicated that intentional learning of vocabulary terms was superior to the incidental learning of vocabulary terms, and it supported the theory that intentional learning is generally more efficient than incidental learning.

This study was an effort to further the knowledge in the area of incidental and intentional learning in typewriting. Students enrolled in beginning typewriting during the spring term of 1972 in a large metropolitan southern school district served as the subjects. The sample

consisted of 104 students who were divided into two intellectual groups: above average, with an I.Q. of 108 to 137; and below average, with an I.Q. between 60 and 87. These groups were further divided into two learning methods: intentional learning and incidental learning. The Incidental and Intentional Learning Groups, therefore, were each composed of students of above average and below average intelligence. The middle I.Q. group was not included in the statistical analysis of the data. All students received a pre-treatment administration of the test of economic understandings as well as two five-minute timed writings measuring gross speed and error rate.

The Incidental Learning Group typed twenty five-minute timed writings on the topic of economics over a five-week period. These students were not told that they were participating in a study, and every effort was made to insure that the students were not made aware of this fact. At the end of the five-week period, the students were given a post-test on economics to determine what learning had occurred incidentally through the typing of timed writings. Two five-minute timed writings were also given to determine the progress of the subjects in terms of type-writing speed and accuracy during the experimental period.

The Intentional Learning Group followed the same format as the Incidental Learning Group with the exception that this group was told to read and concentrate on the materials being typed. They were also told not to sacrifice the speed or accuracy of their typewritten work. They were informed that at the end of the five-week period they would

be tested to see how much they had concentrated on the material being typed. The purpose of this procedure was to determine whether students would learn more economic concepts when told to read the copy and to determine what effect reading had on speed and accuracy of typewritten work.

The results of this study indicated that students in the Intentional Learning Group learned significantly more economic concepts than students in the Incidental Learning Group. In addition, it was found that students in the Intentional Group achieved a significantly greater typewriting speed gain at the .05 level than students in the Incidental Learning Group. There were no indications of any significant differences in the rate of accuracy between the two groups. Of additional importance was the fact that for both above average and below average learners, intentional learning was more efficient than incidental learning. As would be expected, above average learners in both the Incidental and Intentional Learning Groups achieved a significantly greater mean gain on the post-test of economic understandings than below average learners in the two groups.

Conclusions

The following conclusions are offered:

1. For subjects in both the above average and below average intelligence groups, intentional learning of economic understandings is more efficient than incidental learning of economic understandings.

2. Students of above average intelligence obtained higher scores on the post-test of economic understandings in both the Incidental and Intentional Learning Groups than students of below average intelligence.

3. Under the conditions of intentional learning of economic understandings, speed of typewritten work increased at a rate higher than under the conditions of incidental learning.

4. There were no significant interactions on the post-test of economic understandings, the gross speed of typewritten work, or the rate of accuracy among learning methods and intelligence groups.

Implications

Intentional learning in typewriting appears to offer a promising method for the learning of content-oriented material. This study was based on recognition learning of economic facts from typewritten materials in the form of timed writings. The earlier study on intentional learning by Fews (3) was based on the recognition learning of vocabulary terms. Further research should be directed toward determining the type of material and learning approaches that would be suitable to intentional learning in typewriting. This research may show that the learning of certain types of material would be possible through the medium of the typewriter, while other types of material would not.

Various methods of presenting the content also needs to be investigated. Basically, this study employed the use of straight copy material in the form of timed writings. Earlier studies in incidental learning (1, 2, 4, 5, 6, 7) and intentional learning (3) also utilized the timed

writing, or straight copy, as the medium of presenting factual material. Further research should investigate the use of rough draft materials, project type jobs, and so forth, as a means of presenting factual material suitable for intentional learning.

An additional important finding of this study was the fact that students of both above average and below average intelligence profited from intentional learning, whereas only students of above average intelligence profited from incidental learning. The subjects of below average intelligence in the Incidental Group obtained a mean on the post-test of economic understandings that was slightly lower than their pre-test mean. Intentional learning, therefore, appears to offer a method of presenting factual material to the below average learner.

Studies concerned with incidental and intentional learning in typewriting must encompass the effects that the particular learning method has on typewriting progress. Learning methods which have an adverse influence on the student's ability to type would appear to subvert the main goal in a typewriting class, that goal being learning to type. The results of this study indicated that students in the Intentional Learning Group increased their gross speed to a significantly greater degree than students in the Incidental Learning Group. No significant difference was found between the Incidental and Intentional Learning Groups in terms of error rates.

The implication for the inclusion of factual material in typewriting textbooks is obvious. Future writers of typewriting textbooks should be aware of the potential value of the learning which may occur from

typing content-oriented material. Typewriting texts written on various topics may be used to promote learning in additional areas concurrent with improving typewriting skill. The addition of content-oriented material in typewriting books could broaden the role of the typewriting class to include subject-matter learning plus skill learning. Therefore, typewriting students could profit by the typing of materials geared to their particular needs. In this respect, the typewriting class has the potential of being of greater benefit to students.

Recommendations

In view of the results of the present study, the following recommendations are offered:

1. Replication of the present study with the inclusion of the student of average intelligence to investigate the effects of intentional and incidental learning on this group.
2. Further research to determine what types of additional material can be learned through intentional and incidental learning in typewriting.
3. It is recommended that in the writing of future typewriting textbooks recognition and consideration be given to the potential value of the intentional and incidental learning resulting from the typewriting of the materials included.
4. Additional research should be conducted to investigate effects of intentional learning on the speed and accuracy of typewritten work.
5. Further studies might well be directed toward investigating the effect of repetition on intentional learning.

6. Further research studies directed in this area should include a non-typewriting class as a control group to determine the relative efficiency of learning in typewriting over other traditional methods such as lecture presentation or reading.

7. Further research studies should also include a placebo group to determine what role attention and suggestion have on intentional learning.

8. Future research should include a follow-up to determine whether intentional learning of facts remain stable over a period of time.

9. Further research studies should be directed toward determining the relationship between incidental and intentional learning and the interest the subject has in the topic to be learned.

10. Future research should be conducted to determine the student's reading level in his ability to learn materials incidentally and intentionally in typewriting.

11. Further research should include the stratification of students into groups based on level of typewriting skill.

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APPENDIX A

A STANDARD ACHIEVEMENT TEST IN ECONOMIC UNDERSTANDINGS

FOR SECONDARY SCHOOLS, PART I, SIXTH REVISION

- *1. Most American workmen receive higher wages than most foreign workmen chiefly because
 - A. Americans work harder for longer hours
 - B. Americans produce more goods per hour than foreign workers
 - C. labor unions do not exist in foreign countries
 - D. American workmen are protected by a high protective tariff
2. Which of these is the best illustration of an economic problem?
 - A. preparing a blue print for a punch press
 - B. how to decide which one of a number of possible products to make with the punch press
 - C. installing the punch press
 - D. how to instruct a worker in the use of a punch press
3. Conservation of natural resources can best be described as
 - A. preventing people from using natural resources
 - B. using natural resources without wasting them
 - C. finding ways to produce goods without using raw materials
 - D. making natural resources available to all through government ownership
- *4. The amount of goods and services produced is
 - A. sufficient to satisfy all our wants
 - B. unlimited
 - C. determined by forces of nature beyond the control of man
 - D. less than the people want
- *5. A form of business combination in which one company has acquired all or a majority of the stock of several firms is called
 - A. a holding company
 - B. a monopoly
 - C. a cartel
 - D. an oligopoly
6. Among the advantages of labor specialization is the
 - A. feeling of independence and self-reliance it gives the worker on the assembly line
 - B. increased speed of operations
 - C. increased pride of workmanship on the part of the worker
 - D. ease of adjustment to other occupations

7. The national government performs all of these economic functions except
 - A. enforcing pure food and meat inspection laws
 - B. regulating railroad and truck rates
 - C. limiting the price which can be charged by a washing machine manufacturer for his product
 - D. supporting prices of certain farm products
8. Which of these groups receives the greatest share of our national income?
 - A. corporation stockholders
 - B. wage earners and salaried workers
 - C. people who receive interest payments
 - D. people who receive rent
9. A period of general business depression is usually accompanied by
 - A. high prices
 - B. a decline in national income
 - C. few business failures
 - D. full employment
- *10. In which of these fields of economic activity in the United States is there the greatest number of competitors?
 - A. farming
 - B. publishing
 - C. auto industry
 - D. public utilities
- *11. A protective tariff
 - A. promotes international specialization of labor
 - B. protects foreign products
 - C. tends to raise prices for the home consumer
 - D. encourages foreign trade
12. The purpose of workmen's compensation laws is to
 - A. increase wages
 - B. provide workers with funds during periods of unemployment caused by a recession
 - C. pay workers for losses suffered because of injuries on the job
 - D. increase wages to match rising living costs
13. A monopolist, if not restricted by the government, will probably sell his products at a price which
 - A. results in the most sales
 - B. is lower than that of competing products
 - C. returns the greatest net profit
 - D. encourages the use of substitutes

- *14. All of these are forms of credit for consumers except
- A. a charge account
 - B. an installment purchase
 - C. an unpaid telephone bill
 - D. a bank statement
15. In our American economy, who chiefly determines what goods and services will be provided?
- A. national government officials
 - B. New York bankers who provide the money
 - C. state government officials
 - D. consumers
16. Which of these sources of energy will last as long as man inhabits the earth, while the others can be used up completely?
- A. water power
 - B. coal
 - C. petroleum
 - D. natural gas
- *17. The American farmer in peacetime is faced with all of these problems except
- A. a continuing inability to produce enough to meet the demands of an increasing population
 - B. fluctuating prices for his products
 - C. competition from foreign producers
 - D. an increasing need for agricultural machinery.
- *18. Which of the following should a 30-year old man with a wife and two children purchase if he wants the maximum amount of life insurance protection at the cheapest annual cost?
- A. a 20-year endowment
 - B. an ordinary or straight life policy
 - C. a 20-year limited payment policy
 - D. an annuity
19. Socialism is best described as an economic system in which
- A. the government owns all property
 - B. wealth and property are equally divided among the people
 - C. government owns the basic industries and natural resources
 - D. the profit motive prevails
20. The typical American farmer is usually
- A. a capitalist
 - B. a manager
 - C. a laborer
 - D. all of these

21. Which of the following would probably be hurt the most by inflation?
- A. a factory wage earner
 - B. a retired policeman living on a pension
 - C. a stockholder
 - D. a businessman with a large inventory of goods
22. If the cost of living index numbers rise from 120 to 130 during a given period,
- A. money increases in value
 - B. the purchasing power of the dollar declines
 - C. the value of the dollars remaining in savings accounts remains the same
 - D. the cost of living is lowered
- *23. The national government's personal income tax is levied according to
- A. the extent of government benefits received
 - B. the amount of property owned by a person
 - C. the idea of identical rates for everyone
 - D. a person's ability to pay
24. The world's population is
- A. increasing faster than the supply of arable land
 - B. declining because of two world conflicts
 - C. distributed evenly among the nations of the earth according to the extent of their area
 - D. concentrated in those nations which have the most available natural resources
25. During times of rising prices, one way of reducing prices would be to
- A. increase the available supply of goods
 - B. lower the interest rate on bank loans
 - C. decrease personal income taxes
 - D. increase government expenditures
26. All of these are characteristic of modern American production practices except
- A. specialization of labor
 - B. widespread use of machines
 - C. standardization of parts
 - D. custom-made goods
27. A policy of laissez-faire is one of
- A. state regulation of business
 - B. governmental supervision of industry
 - C. "hands off" on the part of the government toward business, agriculture, labor and the consumer
 - D. government ownership of industry

- *28. The Industrial Revolution has resulted in an increase in
 - A. the amount of capital goods needed per worker
 - B. the proportion of farmers in our population
 - C. the value of craft skills
 - D. the bargaining power of the worker acting alone
- *29. Under the conditions of a free market, an increase in the supply of a commodity tends to cause
 - A. substitutes to appear on the market
 - B. a decrease in the price of a commodity
 - C. an increase in the demand for the commodity
 - D. a decrease in the demand for the commodity
- 30. The form of business organization in America which employs most of our wage and salary workers and produces most of our manufactured goods is
 - A. individual proprietorships
 - B. partnerships
 - C. corporations
 - D. cooperatives
- *31. Economic specialization
 - A. decreases the need for trade and exchange
 - B. encourages the growth of barter systems
 - C. is limited by the number of possible customers
 - D. lessens the importance of money and credit
- 32. If engineers receive higher salaries than public school teachers, it is mainly because
 - A. engineers' hours are longer than school hours
 - B. teaching is more pleasant work
 - C. teachers are government workers
 - D. people with engineers' training are relatively more scarce in comparison with teachers
- 33. The size of our national income depends upon all of these factors except
 - A. the effectiveness of our production organization
 - B. the availability of natural resources
 - C. the amount of gold backing up our money supply
 - D. the level of education and technical know-how
- *34. In the long run Americans cannot export more goods and services than we import unless we
 - A. raise our tariffs
 - B. give goods and services to other countries without charge
 - C. send goods and services abroad in American ships
 - D. encourage foreign tourists to come to the United States

35. Socialism and capitalism differ most in regard to
- A. the use of machines to make goods
 - B. specialization of labor
 - C. trade between nations
 - D. the role of the profit motive
36. Federal Reserve Banks
- A. accept individual savings deposits
 - B. furnish checking accounts to businesses engaged in interstate commerce
 - C. hold deposits of member banks
 - D. insure savings accounts in other banks
- *37. Under our reciprocal trade agreements program, the power to raise or lower tariff rates within limits set by Congress is given to
- A. the President
 - B. the U.S. Tariff Commission
 - C. the Department of Commerce
 - D. the Federal Trade Commission
38. The Social Security Act provides for a payroll tax for the support of
- A. public health and accident insurance
 - B. old age and survivors benefits
 - C. the guaranteed annual wage
 - D. unemployment compensation
39. The great majority of our business transactions are made by means of
- A. coins
 - B. paper money
 - C. checks
 - D. barter
40. Which of these is usually the largest item of yearly expenditure for most American families?
- A. clothing
 - B. personal income tax
 - C. food
 - D. recreation
- *41. Approximately what percentage of the total sales of American business corporations is represented by profits?
- A. about 5%
 - B. about 15%
 - C. about 25%
 - D. about 40%

42. A type of financial institution which specializes in making long term loans with which to build or purchase a home is called
- A. a commercial finance company
 - B. a consumer finance company
 - C. a stock exchange
 - D. a savings and loan association
43. Taxes which may be shifted from the person upon whom they are originally imposed to another person are
- A. special taxes
 - B. double taxes
 - C. proportional taxes
 - D. indirect taxes
44. If wages increase, but the cost of living increases at a faster rate, what happens to real wages?
- A. they are higher than before
 - B. they are the same as before
 - C. they are lower than before
 - D. they are not affected
- *45. Most local governments rely on which of these taxes for most of their revenue?
- A. income tax
 - B. real estate tax
 - C. licenses and fees
 - D. excise taxes
- *46. New machines and tools for American industry are generally purchased with
- A. government funds
 - B. earnings retained in the business
 - C. money contributed by employees
 - D. dividends
- *47. A nation's economic prosperity is best measured by
- A. the percentage of people who are working
 - B. the amount of goods and services produced annually per person
 - C. a favorable balance of trade
 - D. the prices of goods in stores
48. All of these are features of modern American capitalism except
- A. the profit motive for production
 - B. the government regulation of public utilities
 - C. absence of competition in most industries
 - D. private ownership of most industries

- *49. The increased use of automation processes in our factories will probably
- A. lower productivity per man hour
 - B. increase the need for machine operators and parts inspectors
 - C. lower the quality of the product
 - D. increase the need for skilled technicians
50. The national debt is most likely to increase when the national government
- A. engages in deficit spending
 - B. balances the budget
 - C. spends less than it receives
 - D. has a budget surplus
51. Which of these statements is true about American labor unions?
- A. less than half of the American labor force are union members
 - B. they generally favor the open shop
 - C. they are illegal in some states
 - D. have no local organizations
- *52. Most business corporations in the United States
- A. are chartered by the national government
 - B. provide for unlimited personal liability of the stockholders
 - C. are exempt from taxes
 - D. continue to exist upon the death of one or more stockholders
53. A budget is best described as
- A. a list of expenditures made the previous year
 - B. an estimate of expected income and a plan for expenditures
 - C. a means of raising money for necessary expenditures
 - D. a plan for purchasing the best quality goods at the lowest prices
54. Which of these places to invest your savings generally carries the greatest risk?
- A. a savings account in a national bank
 - B. a United States Government bond
 - C. common stock
 - D. postal savings account at the post office

APPENDIX B

TIMED WRITINGS ON ECONOMIC CONTENT

More Income Through Increased Production

Most workmen in the U. S. receive higher incomes than do workers in other countries. A main reason for this is the production rate of the U. S. worker due not only to his training but also the machines with which he works. With the making of more goods per hour by U. S. workmen, more goods are made to be sold. This means more income for the U. S. worker. In doing this, U. S. workers do not work longer hours, nor depend on a higher protective tariff than foreign workers. Neither are workers in the U. S. the only ones who are members of labor unions for such unions are found in other countries.

Amount of Goods and Services — Less than the People Want

The amount of goods and services produced is less than the people want. This means that all the wants of man cannot be satisfied even though a large amount of goods and services is found in the U. S. Even though man has been able to resist certain forces of nature, the quantity of goods and services has been limited. Man wants more and more goods and services to satisfy his wants. Certain ones of these goods and services which man wants are scarce. Thus, the amount is not great enough to satisfy all of his wants.

The Holding Company -- A Means of Controlling Other Corporations

A form of business combination in which one company has acquired all or a majority of the stock of several firms is called a holding company. A holding company holds the voting stock of other firms. For example, the U. S. Steel Company would be a holding company if it would buy all or more than half of the stock of a number of firms. This means that U. S. Steel would be able to control certain firms by holding all or more than half of the stock. Thus, a holding company is one which combines with other firms and holds more than half of their stock.

Farming -- A Great Number of Competitors

Although competitors in the economy can be found in more than a few fields of economic activity in the U. S., the farmer has more competitors or rivals than is found in most other fields. For instance, the field of farming is one of the fields which ranks above the auto industry in the number of rivals. This can be found to be the case when the number of rivals in the field of farming is compared with the number in either the field of publishing or public utilities. Of these and most other fields found in the U. S., the farm has the greatest number of rivals.

Increased Prices Through a Protective Tariff

A protective tariff is a tax on goods brought from foreign countries to the U. S. It tends to raise the price paid for goods by the

U. S. consumer. When the U. S. has a high tariff, the home producer of goods has his market protected. Price competition from the foreign maker of goods is thus restricted. This tends to make the price go up for the one who buys in the U. S. A protective tariff discourages international specialization of labor. Foreign trade is discouraged by the high tariff charge which makes the price go up for the buyer in the U. S.

The Bank Statement — Not a Form of Consumer Credit

One kind of bank statement is a list of facts made about a bank at a certain time called a balance sheet. The bank's assets, liabilities, and net worth are shown. The bank statement is not to be used as a form of credit but is used to show some facts about the bank. A good example of a form of credit for consumers is a charge account. An installment purchase is another example. Even an unpaid telephone bill is a form of credit for consumers. Thus, it is clear that a bank statement is not a form of credit for consumers.

Problems of the U. S. Farmer in Peacetime

The U. S. farmer in a time of peace has the ability to produce enough goods to meet the demands of a growing country. Even though the U. S. farmer can produce the goods to meet these needs, problems do face him. One of these is the changing prices for his goods. Also, farmers from foreign lands compete with him. There is also a

growing need for farm machines such as tractors and trucks. Even though the farmer in the U. S. is facing these problems, he has the "know how" in a time of peace to produce enough goods to meet the demands of a growing population.

Inflation — Its Effect Upon Fixed Income

A person on a fixed income is hurt the most by inflation. The purchasing power of money falls when inflation takes place. You have lived in a time of inflation. For instance, at one time a hot dog could be bought for a dime, later for fifteen cents, and now you pay as much as a quarter for one. You can see that a person who is on a fixed or set wage in such a case is hurt the most by inflation. An example would be a retired policeman whose pension does not go up from year to year. He is hurt more than a factory wage earner, businessman, or stockholder whose income climbs with inflation.

The Income Tax Based on Ability to Pay

The U. S. government's personal income tax is levied on one's ability to pay. This means the rates and deductions are not the same for each person who pays an income tax. A person is taxed on the amount of income made rather than the amount of property owned. It is not a benefit tax for a person does not pay to get a direct benefit from it. One in a low income tax scale pays a low percentage of his income as tax; one in a high income tax scale pays a high percentage

of his income as tax. This is based on the principle of taxing a person on his ability to pay.

Growth in Capital Goods Needed Per Worker

The Industrial Revolution which was a change from the use of hand tools to machines brought forth certain changes in the U. S. One change has been the growth that has taken place in the amount of capital goods needed per worker. This revolution or change did not cause such growth in certain other fields. For instance, there has not been growth in the craft skills nor the proportion of farmers in the U. S. Neither has there been growth in the bargaining power of the worker acting alone. Growth has occurred in the amount of capital goods needed per worker.

An Increase in the Supply of a Commodity in a Free Market

Under the conditions of a free market, an increase in the supply of a commodity or good tends to cause a decrease in the price of the good. When the supply increases the sellers tend to bid against one another to sell their output by lowering their prices. There would not need to be a decrease in the demand for the good. Nor would substitutes for the good necessarily appear on the market when the supply is increased. With the good in large enough supply to meet the demand, the price of the good would tend to go down.

The Limitation of Economic Specialization

An example of economic specialization is the plan to raising just one crop on a farm. It is limited by the number of people who might buy the crop. If all persons on the farms in the U. S. planned to raise the same kind of crop, then their sales would be curbed by the number of customers which might be possible. The need for trade and exchange of goods grows through specialization. Also, the importance of money and credit grows through it. Specialization helps do away with barter systems, too. Mainly it is limited by the number of people who might buy the goods.

Exporting Goods Vs. Importing Goods

In the long run the U. S. cannot export more goods and services than it imports unless it gives goods and services to other countries without charge. Sending goods and services abroad in U. S. ships will not solve the problem. Neither does encouraging foreign tourists to come to the U. S. mean more exports. Generally, the U. S. curbs its exports when it raises its tariffs. Over a long period of time, the U. S. cannot send more goods and services to foreign lands than it gets from them unless it gives these goods and services to these lands without any cost to them.

The Power to Raise or Lower Tariff Rates

Through our reciprocal trade agreements program, the power to raise or lower tariff rates within the bounds set by Congress is given

to the President of the U. S. It can be seen that the right to set such rates is not given to others such as the U. S. Tariff Commission, the U. S. Department of Commerce, or the Federal Trade Commission as some might think. The President does ask for and gets recommendations from the U. S. Tariff Commission before he makes a change in tariff rates. Of course, the power to change the rates rests with the President of the U. S.

Profits of U. S. Business Corporations

About 5% of the total sales of U. S. business corporations is shown as profits. This might seem low but it must be kept in mind that big corporations may have large sales. With these large sales the 5% profit figure could mean a large profit to a firm. For instance, a firm with sales of more than one million dollars would have a profit of more than fifty thousand dollars if the rate of profit were 5%. Since the investment in firms is different, a 5% profit on sales for one firm could mean a much larger percentage profit on money invested than for another firm which had a larger investment.

The Real Estate Tax — A Local Government Tax

Most local governments rely on the real estate tax for most of their revenue or income. This means that the real estate tax or the property tax is used most of the time for raising taxes on the local level such as a city or county. The income tax and excise tax are used by the U. S. and some state governments. The states also usually

count on fees and licenses. The real estate tax is thus not relied on by the U. S. or state units as it is by the local units of government. Hence, the real estate tax is mostly a local tax.

What Determines A Nation's Economic Prosperity

A nation's economic prosperity or well being is best found out by the amount of goods and services produced each year per person. The amount of goods and services produced each year per person is a better way to find this out than the per cent of people who are working. This is also true of a good balance of trade and the prices of goods in stores. This means what a nation such as the U. S. produces in terms of goods and services per year per person is the best way of finding out the economic well being of that nation.

The Result of the Growth of the Automation Processes

The growth in the use of automation processes in our factories will probably increase, not decrease, the need for skilled technicians. The amount made per man hour should be at a higher rate, not at a lower rate. The quality of the good made should be higher, not lower, through more use of such processes in our factories, too. The need for operators of machines and inspectors of parts will more than likely be decreased. Even though this will be the case, the need for skilled workers will more than likely tend to grow as the use of automation processes tends to grow in our factories.

The Continuous Life of a Business Corporation

Most business corporations in the U. S. continue to exist upon the death of one or more holders of stock. Thus, if you should hold stock in such a firm and should die, the firm would still go on and not form into a new one. This type of firm is not chartered by the government of the U. S. but by state governments. Also, such firms must pay taxes. The holders of stock in such firms do not have unlimited liability as is the case of a partnership. Also, as was stated above, such a firm continues even upon the death of one or more holders of stock, which is not true in the case of a partnership.

Which Investments Carry the Greatest Risks

Which of these generally carry more risk--common stock or U. S. Government bonds? You would probably say common stock. You would be right because you know that common stock issued by a private firm is not guaranteed by the U. S. Government or one of its agencies. A savings account in a national bank and a postal savings account at the post office would be safer for the same reason. Of course, it should be kept in mind that the risk of loss in earning power during periods of inflation is less for common stocks than for certain investments backed by the U. S. Government.

APPENDIX C

INSTRUCTIONS FOR INTENTIONAL LEARNING GROUP

You recently took a test on the topic of economics. Many of you indicated that you thought that the test was difficult and that you did not know many of the answers. As the majority of you have never taken a formal course in economics, your inability to answer all of these questions is understandable.

During the next five-week period, you will be given timed writings to type on the topic of economics that were covered on this test. As you type these timed writings, I would like for you to read and concentrate on the content of the materials being typed. If you do this, you will find many of the answers to the questions on the test that you took. Do not, however, sacrifice the speed or accuracy of your type-written work.

At the end of the five-week period, I will again give you the same test on economics to see how many facts that you learned from typing the materials. This test will in no way affect or influence your typewriting grade.

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