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ABSTRACT

A study investigated whether students who were allowed to underline, highlight, make notes in the margin, and indicate where they found their answers in the reading selection of a test scored higher than students who were allowed only to refer to the reading materials to find the correct answers. Subjects were 41 students in 2 classes of college freshmen assigned to developmental reading classes at DeVry Technical Institute in Woodbridge, New Jersey. Both classes were given the same amount of time to complete identical reading tests during the course of the 15-week trimester. The control sample took their tests without any changes in procedure. The experimental sample took the first half of the tests in the same manner as the control sample. However, for the second half, they were required to make entries on their tests. These entries included identifying the main idea, making marginal notations, underlining/highlighting, and indicating in the reading selection where they found the answers to the test questions. Results indicated no significant differences between the mean scores of the two groups of students. (Contains 38 references and 3 tables of data.) (Author/RS)

THE EFFECT OF SUPPLEMENTARY ENTRIES ON READING COMPREHENSION TESTS IN COLLEGE LEVEL, DEVELOPMENTAL READING CLASSES

by

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ABSTRACT

This study consisted of two, homogeneous classes of college freshmen assigned to Developmental Reading classes at DeVry Technical Institute in Woodbridge, New Jersey.

Both classes were given the same amount of time to complete identical reading tests during the course of the fifteen-week trimester. The control sample took their tests without any changes in procedure. The experimental sample took the first half of the tests in the same manner as the control sample. However, for the second half, they were required to make entries on their tests. These entries included identifying the main idea, making marginal notations, underlining/highlighting, and indicating in the reading selection where they found the answers to the test questions.

The hypothesis that no significant difference would exist between the samples proved to be correct.

DEDICATION

This thesis is dedicated to my mother, Tula Zanias, whose love for and dedication to her family has never wavered.

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Comprehension, defined as the act or power of understanding, is the paramount objective of teachers of reading. This objective has become even more important because of the demands of a high-tech society at a time when the overall reading comprehension scores of students at all grade levels are proving to be unsatisfactory. As an antidote to this problem, academicians on an international level are conducting studies and attempting to find ways to overcome this malady.

Most of these studies utilize similar strategies in an attempt to determine which one or which combination of strategies can best enhance comprehension. The strategies that are employed in these studies include underlining/highlighting; making marginal notations/ glossing; identifying the main idea of each paragraph in a reading selection; and suggesting that courses be required of students that emphasize study and test-taking skills. The myriad of available information is inconclusive as to which strategy or combination of strategies can best improve reading comprehension.

For example, a study by O'Shea and O'Shea (1991) suggested that underlining improves comprehension, and a study by Draheim (1986) found that mapping and directed reading and reading and underlining significantly affect comprehension and retrieval. Witte (1980) found that

glossing seemed to help students with the short-term retention of important ideas, and a study by Stewart and Cross (1993) resulted in better long-term incidental learning and total test scores with gloss type.

On the other end of the spectrum, Chu (1987) and Prinzo and Danks (1984) concluded that highlighting and underlining did not facilitate reading performance.

However, the majority of the literature as expressed by Chu (1991), Tanner (1987), and Nist (1987) indicated that the aforementioned are all acceptable strategies for enhancing reading performance but have not conducted studies to affirm their beliefs.

As a final note, scores obtained on most classroom reading tests are earned through the limited process of not allowing the test-taker to make entries on the reading selection. It is believed by some that this passive process may limit the comprehension level and, therefore, the grade earned by the test-taker. However, there are those who believe that if the test-taker was allowed to make entries on these tests -- allowing for a more active test-taking process -- the level of comprehension and, therefore, the grade earned may be enhanced.

HYPOTHESIS

To provide additional information on this topic, a study was conducted hypothesizing that no significant

difference would exist between the mean scores of the sample of students who are allowed to underline/ highlight, to make notes in the margin, and to indicate where they found their answers on the reading selection of a test as compared to a sample of students who are allowed only to refer to the reading material to find the correct answers.

PROCEDURES AND SAMPLE

Two classes of college freshmen assigned to a Developmental Reading class at DeVry Technical Institute in Woodbridge, New Jersey, participated in this study. Each class was heterogeneous. The first group, designated Group A, consisted of 21 students, 18 males and 3 females. The second group, designated Group B, consisted of 20 students, 12 males and 8 females.

Both groups at the beginning of the semester were given instruction and related assignments from their text (All of Us: A Multicultural Reading Skills Handbook by Wiener and Bazerman), magazines, handouts, and other texts concerning the development of skills relating to underlining/highlighting, main idea, marginal notations/glossing, and study skills.

During the course of the trimester Group A and Group B -- designated by using a random assignment procedure -- were given the same amount of time to complete identical reading tests. One sample (Group A) was designated the

control group. This sample took their tests for the entire trimester without any changes in procedure; that is, upon completing the reading assignment, they were allowed to refer back to it to answer their questions, yet they were not allowed to make any entries on the test.

The other sample (Group B) was designated the experimental group. This sample took the first half of their tests in the same manner as the control sample. However, for the second half of their tests, they were required to make entries or their tests that included identifying the main idea, making marginal notations, and underlining/highlighting. They were also required to indicate in the reading selection where they found the answers to their test questions.

To compare the results, means were determined for both the control and experimental samples for the first and second half of the experiment and analyzed using students' "t".

RESULTS: ANALYSIS OF DATA

The mean scores for the first half of the study were 81.43 for the control group and 79.91 for the experimental group as indicated in Table I. The numerical difference between the mean scores was only

TABLE I

Mean, Standard Deviation, and t

of the Samples' First Half Scores

Sample	Mean	Standard Deviation	t	Significance
Control	81.43	10.13	.44	n.s.
Experimental	79.91	10.00		

1.52, and the t score was determined to be .44 which is non-significant.

For the second half of the study -- the phase during which test-taking strategies differed -- the mean scores were 81.85 for the control sample and 83.90 for the experimental sample as indicated in Table II. The numerical difference between the mean scores was 2.05,

TABLE II

Mean, Standard Deviation, and t

of the Samples' Second Half Scores

Sample	Mean	Standard Deviation	t	Significance
Control	81.85	8.35	-.73	n.s.
Experimental	83.90	7.91		

and the t was determined to be -.73 which is, again, non-significant. However, the experimental sample increased its mean score by 3.99 points whereas the control sample increased its mean score by only .42 points when compared to the means of the first half of the study.

Table III, which includes the total scores of both groups, only showed a difference in the mean score of

TABLE III

Mean, Standard Deviation, and t
of the Samples' Total Scores

Sample	Mean	Standard Deviation	t	Significance
Control	81.64	7.87	-.13	n.s.
Experimental	81.97	7.19		

.33 and a t of -.13 which is, again, non-significant.

CONCLUSION

The hypothesis that no significant difference exists between the mean scores of a sample of students who are allowed to underline/highlight, to make notes in the margin, and to indicate where they found their answers on

the reading selection of a test as compared to a sample of students who are allowed only to refer to the reading material to find the correct answers proved to be correct and the hypothesis was accepted. In simpler terms, the students had reasonably similar scores regardless of the strategy they employed.

DISCUSSION AND IMPLICATIONS

Using the t tests, the analysis did not reveal any statistically significant difference between the control and experimental samples. However, some interesting revelations came forth that were not measurable.

The students in the experimental sample who used the more active approach to reading during the second half of the study spent more time than the control sample completing their tests. A study by Glynn (1978) suggests that because underlining encourages learners to interact with the instructional materials longer, more information may be acquired. Poostay (1984) stated that underlining as a strategy helps students identify key concepts. As previously stated, the experimental sample scored 3.99 points higher on the second half of the test when compared to the first half of the test. It is the belief of the researcher that the additional time spent on the test by the experimental group allowed for this increase in the mean score.

Also, a hearing impaired student was inadvertently included in the experimental sample. This student advised the teacher (also the researcher) at the beginning of the trimester that she had done poorly on reading comprehension tests throughout grade school, middle school, and high school and that it was determined by professionals that her hearing impairment caused this problem. Surprisingly, her mean score for the second half of the study was 85.00 as compared to her mean score of 64.33 for the first half of the study -- an increase of 20.67 points.

Lastly, on returning the corrected tests to the class, the experimental sample appeared to have a better understanding and recall of the reading material when discussing the questions and answers on the test.

In summary, using an active approach to reading and test taking appears to help some students with their understanding, recalling, and grades. Further research, over a longer period and using measures of understanding, recalling, and grades, should be conducted.

STUDY TECHNIQUES:
RELATED LITERATURE

Of all the strategies recommended by educators to improve students' comprehension and retention of subject matter, the most popular is underlining/highlighting (Blanchard, 1985). Much of its popularity may be due to recognizing it as an active process which helps to make reading an active rather than a passive process (McCabe, 1982). The belief is that if students can independently underline the key concepts in a selection, they demonstrate that they can identify the unique words, phrases, or figures of speech that will affect their comprehension of that selection (Poostay, 1984). This last statement reflects the von Restorff or isolation effect which suggests that if information is isolated from a background, it has a higher ability of being recalled (Nist 1987).

Another popular strategy, which has been used since medieval times, is glossing or the writing of marginal notes, questions, and commentary (either practitioner or author generated) in a text. Gloss notations focus on both the process (skills and strategies) of reading and the content (facts and concepts) of texts (Richgels and Hansen, 1984). In addition, it is believed that one of glossing's assets in enhancing comprehension is reflected in the findings of Smirnov; that is, glossing helps students use meaningful and varied repetition as they read content texts (White and Witte, 1979).

Texts and courses teaching study skills to students from the grade school level to the college level are replete with chapters explaining the virtues of underlining/highlighting and glossing to aid students' comprehension and retention. The popular SQ3R and the less-known SQ10R methods also suggest underlining/highlighting and glossing as useful study methods.

Although much of the literature is supportive of underlining/highlighting and glossing as strategies to aid comprehension and retention, the literature is also reflective of evidence that is not only inconclusive but also not reflective of their superiority relative to other strategies. Also, there is some evidence available that is not at all supportive of their virtues.

In reference to the supportive literature, Rickards and August (1975) used 90 college students to examine subject-generated as compared to experimenter-provided underlining of sentences (one per paragraph) that were least or most important to the overall structure of the passage presented. Additionally, some readers were instructed to underline any one sentence per paragraph, while others were asked simply to read the passage. The results of the study indicated that those who were relatively free in their underlining (subject-generated group) were equal or superior to any other group on all

measures of passage recall.

Students from 11 classrooms in two primary schools in Brisbane, Queensland, Australia, who were identified as having reading difficulties, were trained to underline key word and phrases as they read a passage. After the training had been completed, O'Shea and O'Shea (1994) indicated in their study that the combination of awareness of purpose and the employment of a self-regulated strategy generated better comprehension performance.

In a study consisting of 67 students in 4 classes of a 7-week study skills course, one group was trained in text annotation, one group was trained in underlining, and two control groups were given no training. The results indicated that for short term learning, strategic underlining would appear to be an effective study technique (Harris, 1990). However, a study described by Hartley, Bartlett, and Brainthwaite (1980) found that subjects, tested by the cloze procedure, recalled underlined words in a text significantly better in both short-term and long-term (seven days later) memory than subjects who had the normal text.

A study conducted by Draheim (1986) examined the effectiveness of (1) the Directed Reading - Thinking Activity, (2) conceptual mapping, (3) a combination of those strategies, and (4) reading and underlining main

ideas as strategies for helping students remember main ideas. The findings of the 48 composition students at a large public university suggest that mapping alone was not effective, but that mapping and directed reading, and reading and underlining, significantly affect comprehension and retrieval. Amer (1994) also used an overlapping strategy in testing students. He found that the knowledge-map and underlining strategies improved performance on open-ended questioning and summarization of scientific texts.

Schnell and Rocchio (1978) concluded from data found in existing literature and from an experiment that they conducted which reported major findings (significant at a level of at least .05) that the use of underlining can result in significant improvement in reading comprehension and retention of textbook type materials.

The Basic/Technical Literacy Project at White River Vocational Technical School in Arkansas (1990) implemented highlighting as a part of their comprehensive curriculum to raise students' basic reading and technical literacy levels in their chosen skill area. Statistics gathered from 6 schools that had initiated most of the project curriculum showed increases in the students' reading levels and a better retention rate in their technical classes. Reading levels increased an average

of one grade level.

Another practical finding was reported by Tanner (1992). A home economics teacher, after requiring her students to highlight important information on recipes, found that skilled readers questioned recipe jargon 98% of the time and highlighted 4 to 5 words per recipe. Testing results likewise proved highlighting to be a valuable tool with scores ranging between 90-98%. When placed in a lab situation, these students were on-task, producing high-quality food products.

As a last note on underlining/highlighting, Fowler and Barker (1974) examined 4 groups of 19 college students each. Detailed analysis implied that highlighting improves retention of selected text material and that active highlighting is superior to passive reading of highlighted material. Traditional underlining was also found effective as an emphasis technique.

In respect to glossing, marginal glosses were found to aid students in recalling significantly more of a passage than those receiving no help. This finding was reported by Davis (1989) in an attempt to determine whether marginal glosses improve the comprehension of a literary text read in a foreign language by intermediate-level college students.

Richgels and Mateja (1984) have surmised from existing literature that if gloss is used in stages --

demonstration, development, internalization, and fading -- and with the added dimension of teacher modeling, students can be helped to combine process and content for successful learning from content area texts.

To this point, the virtues of these active reading processes have been discussed; however, the following literature reflects not only inconclusive findings but does not show these strategies as necessarily being superior to other methods. For example, Idstein and Jenkins (1972) conducted two experiments in an attempt to determine whether underlining was superior to repetitive reading. Upon completion of the study, it was concluded that underlining is no more effective than repetitive reading, even for long passages.

Stordahl and Christensen (1956) conducted a study which applied four study techniques -- underlining, outlining, summarizing, and reading and re-reading to Air Force basic trainees. The subjects were randomly assigned to the techniques to be used. The trainees were given two passages of Air Force materials to read. Comprehension of the materials was measured by an objective test immediately after studying the material and one week later. The study techniques were found to be equally effective as measured by comprehension of the material both immediately after studying and one week later.

Another study of Air Force personnel conducted by Klare, Mabry, and Gustafson (1955) found that the more able subjects (high-aptitude airmen) may well benefit from underlining while the less able may not be able to.

The effects of text underlining were also studied by Nist and Hogrebe (1987). The subjects were 67 provisionally admitted freshman who were randomly assigned to one of four experimenter-generated underlining or underlining and annotating conditions, or a fifth group who generated their own text marking. The results showed that subjects who generated their own underlining and their own text marking did not perform better than those who were given experimenter-generated marking.

Two experiments conducted by Golding and Fowler (1992) investigated the facilitative effect of typographical signals such as underlining, headings, or other devices to help readers identify specific points. The results do not support a general facilitative effect of typographical signals but suggest that use of signals depends on the reader's strategic processing.

Glynn (1978) stated that learner-generated underlining appears to function in much the same way as experimenter-provided underlining. When processing times are controlled, there is no appreciable gain in learning achieved relative to a no-underlining control. However,

because underlining encourages learners to interact with the instructional material longer, more information may be acquired.

A study by Kopinus and Haynes (1983) revealed the same results as the Glynn study -- results showed no significant difference between the underlining and no-underlining groups on any of the measures.

Thirty college freshman in a Liberal Arts curricula were assigned to study passages by 3 different methods; reading, reading with underlining, and reading with note taking. Hoon (1974) asserts that the findings question the assumed value of underlining and note taking during study and imply that future research might better be aimed at improving verbal rather than study skills.

In a review of the literature by Gustafson and Pederson (1984), a study by Holmes (1972) was cited that revealed that no difference in standard deviation was found in the comprehension and retention levels of two separate groups -- one assigned to underlining and the other assigned to SQ3R.

Prinzo and Danks (1984) conducted a study which divided 100 students into 3 experimental groups. The students in the first group were told to concentrate on knowing the underlined portions of a text and were told that by focusing their study time on those positions, they might do better on a test. The students in groups

2 and 3 were told to study the text as they normally would when preparing for an examination. No mention was made of underlining. The results of the test indicated that although the students supplied with the underlined text did no better than the students who had the unmarked text, they spent less time preparing for the test.

As for glossing, a study by Witte (1980) discovered that glossing seems to be particularly helpful to teachers who want to be closely involved with guiding and directing student learning. Results also indicate that students need to be trained in the use of gloss techniques in order to insure their successful application. However, while gloss seems to help students with their short-term retention, it does not seem to aid their learning of more global concepts.

A second note on glossing indicates that studies conducted thus far report that teachers and students like glossing and find it useful; however, the empirical evidence that glossing affects comprehension and retention is neither extensive or conclusive (Stewart and Cross, 1991).

Some literature is available that is not supportive of the above mentioned strategies. As far back as 1938, a study was conducted by Mathews that indicated that when time was kept constant, merely reading the materials with intent to understand and remember was more effective than

underlining and making marginal notes or outlining for immediate recall, and more effective than underlining and making marginal notes for delayed recall (Mathews, 1938).

A study by Leicht and Cashen (1972) also reported that isolating an item against a homogeneous background (the von Restorff Effect) by highlighting or underlining it did not appear to facilitate learning and aid exam performance.

The remainder of the literature makes no judgement as to the overall effectiveness of the aforementioned strategies, but instead relates to these strategies, sometimes in conjunction with other strategies, as viable study techniques.

Shaughnessy (1994) states that although many students have found the SQ3R and PQ4R systems to be helpful, developmental/remedial students may need more assistance than the average freshman and, therefore, may want to implement the SQ10R system. All of these systems employ the similar strategies of underlining/ highlighting, marginal glossing, note taking, and etc. - either outwardly or implicitly as learning strategies.

An article written by McCabe (1989) suggests the deliberate rewriting of lecture notes is the key to successful learning. In his outline technique, underlining and/or highlighting play an important role.

Nist (1987) in conjunction with Georgia State

University prepared a pamphlet to teach students to annotate and underline text effectively. She states that annotating and underlining have a dual purpose: students can isolate key ideas at the time of initial reading and then study these ideas later as they prepare for exams.

Poostay (1984) offers practical suggestions on using underlining as a strategy to help students identify key concepts. Similarly, Craik and Martin (1980) and Blanchard (1985), all teachers at the college level, have written articles also offering practical suggestions on using underlining as a successful study skill.

As is the case with underlining or highlighting, glossing is also considered a viable study technique as indicated in the following literature.

Like Poostay, Craig and Martin, and Blanchard, Richgels and Hansen (1984) published an article giving teachers guidelines for preparing gloss notations focused to help readers develop specific reading skills and strategies.

According to Otto (1981), marginal and other intratext notations (gloss) can be used as an instructional technique to direct readers' active attention to (1) places in the text where the application of specific skills would be appropriate, (2) instances where a particular strategy could be useful for extracting meaning, and (3) key words and ideas. In

addition, while glossing may offer an effective way to deal with specific strategies, its focus should be broadened to include the more general strategies that efficient readers use to understand text.

A second article by Otto in conjunction with Hayes (1981) makes reference to the use of marginal notations (glossing) to direct readers attention while they read. Gloss notations, it is believed, may serve as an aid to direct students to content areas of text and to levels of understanding that make optimal use of their current -- and sometimes limited -- reading ability.

White and Witte (1979) refer to the findings of Smirnov and their own interviews which indicate that students frequently use repetition. However, some may need specific instruction in how to vary repetition so that it will help them learn the material they are reading. Marginal gloss, therefore, might help students use meaningful and varied repetition as they read content texts.

On a last note, Witte (1981) makes reference to marginal gloss and states that teachers accept it as a credible technique that requires much work and effort on the part of both the teacher and the students.

Taking into consideration all of the information from the literature above, one gets the general impression that an active as opposed to a passive

strategy in relation to the reading process is more beneficial in helping students comprehend and retain their reading material. Additional research needs to be encouraged to lend credence to the use of such strategies among students and teachers.

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APPENDICES

APPENDIX A

Mean Scores for the First Half of the Study

Control Sample		Experimental Sample	
Student	Score	Student	Score
1	88.67	1	83.67
2	87.75	2	84.33
3	74.50	3	64.33
4	71.25	4	70.25
5	91.25	5	80.25
6	67.00	6	86.50
7	89.50	7	70.25
8	75.75	8	71.50
9	100.00	9	69.00
10	76.50	10	69.00
11	88.00	11	87.67
12	65.34	12	100.00
13	88.25	13	82.25
14	63.25	14	82.25
15	83.67	15	94.00
16	86.50	16	83.33
17	85.75		
18	82.75		

APPENDIX B

Mean Scores for the Second Half of the Study

Control Sample		Experimental Sample	
Student	Score	Student	Score
1	84.33	1	83.25
2	90.75	2	72.75
3	81.25	3	85.00
4	82.50	4	91.67
5	72.50	5	86.00
6	72.00	6	83.33
7	84.33	7	73.25
8	87.50	8	91.67
9	88.25	9	72.75
10	90.75	10	72.67
11	81.50	11	84.33
12	83.67	12	87.67
13	80.33	13	97.00
14	58.25	14	79.33
15	79.00	15	87.75
16	91.67	16	94.00
17	89.00		
18	75.75		

APPENDIX C

Mean Scores for the First and Second Half of the Study

Control Sample		Experimental Sample	
Student	**Score**	**Student**	**Score**
1	86.50	1	84.46
2	89.25	2	78.54
3	77.88	3	74.67
4	76.88	4	80.96
5	81.88	5	83.13
6	69.50	6	84.92
7	86.92	7	71.75
8	81.63	8	81.59
9	94.13	9	70.88
10	83.63	10	70.84
11	84.75	11	86.01
12	74.51	12	93.84
13	84.30	13	89.63
14	60.75	14	80.80
15	81.34	15	90.88
16	89.09	16	88.67
17	87.38		
18	79.25		