Effects of Cornell, Verbatim and Outline Note-Taking Strategies on Students' Retrieval of Lecture Information in Nigeria

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Abstract

This study focused on the effects of Cornell, Verbatim and Outline note-taking strategies and review on College of Education Students' retrieval of lecture information in Plateau State, Nigeria. A 2x4 factorial design was used whereby 160 NCE 2 students of two Colleges of Education in Plateau State, were randomly assigned to 6 experimental and 2 control groups. Groups 1-6 (experimental groups) were trained in taking Cornell, verbatim and outline notes, while groups 7-8 (control groups) were given no treatment. Also, there were two review conditions- Review/No Review. The instruments used for data collection were free-recall, multiple-choice, true or false and essay tests. Data collected were analyzed using mean, t-test, one-way ANOVA, 2x4 ANOVA and Tukey HSD test. Findings of this study indicated that: Cornell note-taking was the most effective in enhancing retrieval of lecture information and Outline note-taking was more effective than Verbatim. It was also found that review of notes enhanced retrieval of lecture information.

Keywords: Note-taking Strategies, Cornell, Verbatim, Outline, Review, Retrieval

1. Introduction

The concept of retrieval is of great concern to psychologists. Current trends in educational psychology suggest that researchers are showing growing interest in how people receive, interpret, encode, store and retrieve information (Berliner, 2006). This is because retrieval is crucial to achieving academic excellence. To retrieve successfully, proper encoding and storage of information must have been done for what is not stored cannot be retrieved neither can it be applied. Note-taking and review are considered vital instructional tools that can be employed to facilitate retrieval. Note-taking plays a vital role as the link between acquiring and remembering information in order to achieve high grades in school (Putnam, Deschler & Schumaker, 1993). Moreover, inability to retrieve information when needed is a factor that may be responsible for examination malpractice in Nigeria. A number of studies (Okubanjo, 2007; Croucher, 1997; Godfrey & Waugh, 1993) have reported that cheating is a common phenomenon practiced by some students at all levels of education including tertiary institutions and they use different techniques. Sometimes, students engage in examination malpractices for fear of not remembering adequate points during examinations. In the light of this, Okubanjo (2007) recommended that students in higher institutions of learning should be taught study skills which will help them achieve high grades. One of such study skills which was the focus of this research is note-taking.

Most studies affirm that note-taking serves two main functions: encoding function and external memory function (Boyle & Weishaar, 2001 & Kiewra, 1989). The encoding function proposes that note-taking helps the learner to transcribe information received into meaningful concepts (Einstein, Morris & Smith, 1985) and the external memory function proposes that note-taking provides the learner with a document that students can refer to when preparing for tests and examinations (Boyle & Weishaar, 2001). Generally, note-taking and review are valuable in enhancing retrieval. However, since there are different strategies of taking notes and some strategies appear to enhance retrieval better than others; the present study aimed at discovering which of three note-taking strategies will enhance retrieval most amongst college of Education students in Nigeria. Specifically, the current study was undertaken to investigate the effects of Cornell, verbatim, outline note-taking strategies and review on retrieval of lecture information.

Cornell note taking style or 2-Column method was developed by Walter Pauk of Cornell University, United States of America (U.S.A). The Cornell system is said to be unique as it was designed to save time. There is no rewriting or retyping of the learner's notes. Each step of the system naturally prepares the way to the next step in the learning process (Counseling & Development Centre, 2002; Pauk, 1974). It encourages the recording of main points and use of telegraphic sentences. It seems a simple format that most learners can use. This study sought to find out the extent to which this note taking strategy could enhance retrieval of lecture information especially within the Nigerian context.

Verbatim note-taking style requires that learners record information presented word for word. Students often complain about their inability to determine during the lecture what is important and what should be left out in taking notes. Such students tend to write down every word uttered by the lecturer. There was need to find out the effectiveness of this strategy in enhancing students' performance.

Outline or paraphrased note-taking style requires that main ideas and sub-points in a lecture are identified and

written down. The notes are not crowded and the main points are underlined for emphasis. Roman numerals, letters, numbers and indenting are used for orderliness. The main points are indented and sub-points are further indented. The present study sought to investigate the effectiveness of this strategy in enhancing students' performance. Furthermore, the present study sought to investigate how the review of Cornell, Verbatim and Outline notes could be effective in enhancing students' retrieval and academic performance. This study was also concerned with discovering the most effective note-taking strategy that would contribute immensely to good retrieval and academic performance.

1.1 Statement of the problem

In Nigerian institutions of higher learning, the student's role in a lecture is to listen and take notes. However, students often face the challenge of effective note-taking skills to use to enhance retrieval. Research has also shown that students exhibit poor note-taking habits (Nilson, 2006; Kiewra, 2005, 1985; Norton, 1981 & Thomas, 1978). Some students take rough notes with the aim of re-writing or typing them later. This requires a double amount of time to take and re-write notes. Nilson, 2006 affirmed that only 33% of students have decent notes. Some students take lecture notes in short-hand whereby a lot of time and energy will be wasted in transcribing such notes into readable form. Some students record the lecture on cassette tapes. However, lecture on tape does not seem to give room to flexibility in note-taking nor can it be studied selectively (Academic Resources Center, 2001). Moreover, some do not take notes at all, thinking they will remember the information later or get hand-out (if available); whereas literature suggest that individuals forget 60% of information acquired in a lecture within 24 hours (Boon, 1989) and 80% within two weeks (Pauk, 2000) if notes are not taken. Also, some students take detailed notes while some take scanty notes. Therefore, there is need for more empirical studies on effective note-taking strategies that can enhance retrieval in order to guide against ineffective learning.

2. Research Objectives

The study was designed to:

i) investigate the effects of Cornell, Verbatim and Outline note taking strategies on retrieval of lecture information.

ii) determine which of the three note taking strategies will enhance retrieval of lecture information most.

iii) examine the effects of review on retrieval of lecture information.

2.1 Research Hypotheses

i) There is no significant difference among the mean scores of Cornell, Verbatim and Outline note-takers and Non note-takers in retrieval tests.

ii) There is no significant difference between the mean retrieval scores of students who review their notes and those who do not review.

iii) There is no significant interaction effect between note-taking style and review of notes in Free recall test.

3. Methodology

3.1 Research Design

This study was an experimental research, using the post-test control group research design. Furthermore, a 2x4 factorial design was used whereby four (4) note-taking conditions (Cornell, Verbatim, Outline and No Notes) were crossed with two (2) review conditions (Review and No review).

3.2 Participants

Students in higher institutions of learning, especially Colleges of Education, constituted the target population. The sample comprised 160 National Certificate of Education (N.C.E.) 2 students of Federal College of Education, Pankshin and College of Education, Gindiri, in Plateau State of Nigeria. Restriction of the study to 2nd year N.C.E students was based on the fact that final year (N.C.E 3) students were preoccupied with Teaching Practice and Project writing preparations.

3.3 Measures

The instruments for data collection were Free-recall and Achievement tests (Multiple-Choice and Essay tests). The instruments were designed by the researcher to measure retrieval of a lecture on 'Stress' and were validated by experts in Educational psychology and Research Methods. The 35-minute video-taped lecture on "STRESS" (psychology) used was derived from "Microsoft Encarta" (2007). The retrieval tests were contained in sections C and D of the experimental booklet given to each participant. Sections A and B of the booklet contained note-taking/no notes and review/no-review instructions (depending on the treatment conditions). The retrieval tests were scored using idea units that were derived from the lecture material presented. Each idea unit recalled, when matched with the master list, attracted 1 mark each. Thereafter, an independent rater randomly selected and scored a sample of 16 retrieval test papers using the master list of idea units. This produced an inter-rater

reliability coefficient, r=0.94.

3.4 Procedure

The procedure for data collection was as follows: Respondents were randomly assigned to eight (8) treatment groups. There were six (6) note-taking groups and two (2) no-notes groups. Groups 1 – 2 took Cornell notes, Groups 3 – 4 took outline form notes while Groups 5 – 6 took verbatim notes. Groups 7 and 8 were not allowed to take notes (control groups). Also, Groups, 1, 3, and 5 reviewed their notes, Group 7 reviewed lecturer's own note while Groups 2, 4, 6 & 8 were the "No-Review" groups – they were not allowed to rehearse their notes. The eight treatment groups were:

    Gp 1:   Take Cornell notes – Review Cornell notes   [TCN – RCN]
    Gp 2:   Take Cornell notes – No review   [TCN – NR]
    Gp 3:   Take outline notes – Review Outline notes   [TON – RON]
    Gp 4:   Take outline notes – No review   [TON – NR]
    Gp 5:   Take verbatim notes – Review verbatim notes [TVN – RVN]
    Gp 6:   Take verbatim notes – No review   [TVN – NR]
    Gp 7: Take No notes – Review Lecturer's note   [TNN- RLN]
    Gp 8:   Take No notes – No review   [TNN – NR]

The experimental groups (Groups 1-6) were trained for four weeks on how to take Cornell, Outline and Verbatim notes. They were also trained in reviewing Cornell, Outline and Verbatim notes (Groups 1, 3 and 6 only). Evaluation was done by asking respondents questions and giving room for practicing skills acquired. At the end of the treatment sessions, all 8 groups were given post-tests.

On the final day of the experiment, eight (8) types of experimental booklets were given to respondents according to the experimental conditions. Each experimental booklet (1-8) consisted of sections A-D. Sections A and B contained notes/no notes and review/no review instructions. Section C had space for free-recall and Section D had three parts: Part 1 of the test contained 10 multiple-choice questions, part 2 contained 5 True or false questions while part 3 contained 5 essay questions. Section D (post-test), also designated as achievement test was the same for all groups and was administered after collecting sections A-C booklets, to avoid test malpractice.

3.5 Data Analysis

Data collected were analyzed using Mean scores of each group, one-way ANOVA, 2x4 ANOVA and Tukey HSD tests. Also, graphical representations of the interaction effects between note-taking and review were done using bar charts and line graphs.

4. Results

Hypothesis 1:

There is no significant difference among the mean scores of Cornell, Verbatim and Outline note-takers and Non note-takers in retrieval tests.

Table 1: Total Mean Scores of Note-taking Groups

	Cornell	Outline	Verbatim	No notes	N
Free recall	8.60	6.50	4.10	5.25	40
Achi. Test	13.05	11.98	10.35	10.95	40

Table 2: 2x4 Factorial ANOVA Summary Table (Free-recall)

Source of variation	Sum of Squares	Df	Mean square	F	P	α< 0.05
Rows (Review Conditions)	74.26	1	74.26	8.69	0.0037	s
Columns (Note-taking Styles)	441.27	3	147.09	17.22	<.0001	s
R x C (Review x Note-taking)	120.56	3	40.19	4.7	0.0036	s
Error	1298.74	152	8.54			
Total	1934.74	159	-	-	-	

Table 3: 2x4 Factorial ANOVA Summary Table (Achievement test)

Source of variation	Sum of Squares	Df	Mean square	F	P	α< 0.05
Rows (Review Conditions)	61.26	1	61.26	10.67	0.0013	s
Columns (Note-taking Styles)	169.07	3	56.36	9.82	<.0001	s
R x C (Review x Note-taking)	9.86	3	3.29	0.57	0.6356	
Error	872.75	152	5.74			
Total	1112.94	159	-	-	-	

Table 1 shows that Cornell note-takers had the highest mean scores in all retrieval measures. The 2x4 ANOVA results in Tables 2 and 3 reveal significant main effects of note-taking styles. In Tables 2 and 3 (**Columns**- Note-taking Conditions), since P <.0001 is less than 0.05 for each retrieval measure, hypothesis one is therefore rejected. That means a significant difference exists among note-taking scores in Free-recall and Achievement tests. Therefore, a significant difference exists among the mean scores of Cornell, Verbatim, Outline and No notes groups in retrieval tests.

Furthermore, a post-hoc comparison test using Tukey HSD test shows Cornell note-taking as the most effective of the three note-taking styles. Cornell note-taking was found to be superior to Outline and Verbatim note-taking; showing the ranking: Cornell > Outline > Verbatim; p < 0.05 for Free-recall. This implies that Cornell note-taking is the most effective (of the three note-taking strategies) in enhancing retrieval of lecture information.

Hypothesis 2:
> There is no significant difference between the mean retrieval scores of students who review their notes and those who do not review.

Table 4: Observed Condition Means from a 2x4 Factorial Design (Free Recall)

	Cornell	Outline	Verbatim	No notes	Tot
Review	10.7	6.9	4.7	5.0	6.8
No Review	6.5	6.1	3.6	5.5	5.4
Tot	8.6	6.5	4.1	5.3	

Table 5: Observed Condition Means from a 2x4 Factorial Design (Achievement Test)

	Cornell	Outline	Verbatim	No notes	Tot
Review	14.1	12.3	11.0	11.5	12.2
No Review	12.1	11.7	9.7	10.5	11.0
Tot	13.1	12.0	10.4	11.0	

Comparison of the mean scores of treatment groups (as shown in tables 4 and 5) reveals that respondents that reviewed lecture notes performed better on retrieval tests ($\overline{X}$ = 6.8 for Free Recall; $\overline{X}$ = 12.2 for Achievement Test) than those that did not review lecture notes ($\overline{X}$ = 5.4 for free Recall; $\overline{X}$ = 11. 0 – achievement test). These point to the effectiveness of review before tests. Also, as shown in tables 2 and 3 (See hypothesis 1), a 2x4 ANOVA for each recall measure (**Rows**- Review Conditions) revealed significant difference between reviewing of notes and no- review. Since P: 0.0037 is less than 0.05 (Free Recall) and P: 0013 is less than 0.05 (Achievement Test), the hypothesis is rejected. That means a significant difference exists between Review and No Review.

Hypothesis 3:
> There is no significant interaction effect between note-taking style and review of notes in Free recall test.
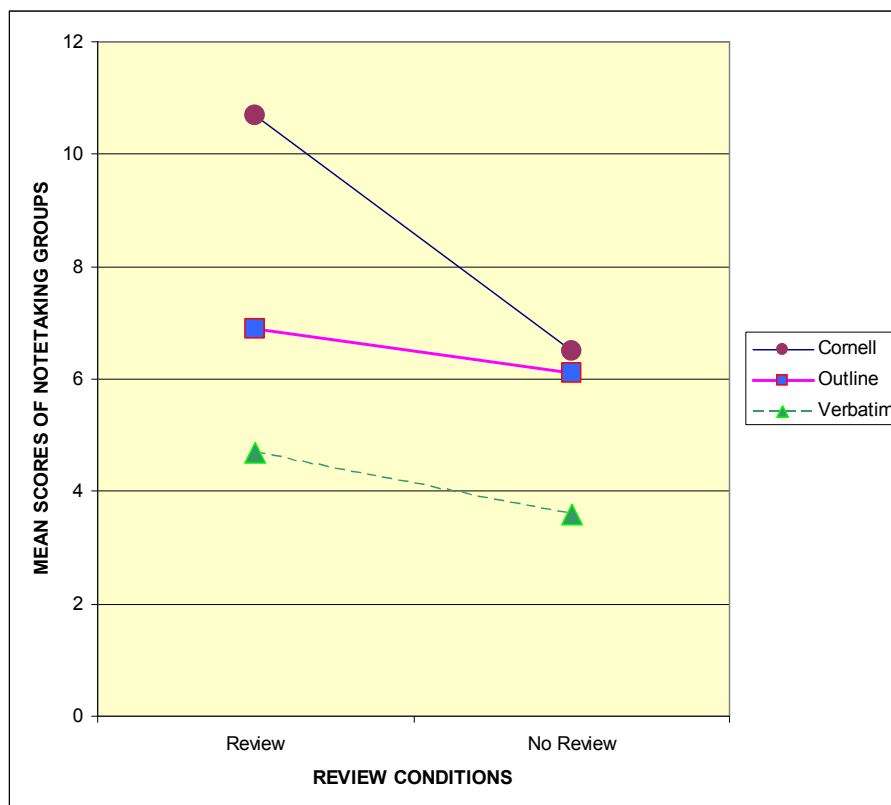
Figure 1: Interaction Effect Between Note-taking and Review Conditions (Free-Recall)

To find out the pattern of interaction between note-taking and review conditions, 2 x 4 ANOVA test and line graphs were used. The 2 x 4 ANOVA test in Table 2 reveals a significant interaction effect between note-taking and review (Free recall); since $P<0.003$ is less than 0.05. Furthermore, that the three lines in Figure 1 are not parallel shows that an interaction is present. The presence of an interaction implies that the main effects of note-taking styles, even though significant, will be qualified by the presence of the review factor. Therefore, hypothesis 3 is rejected. There is a significant interaction between note-taking and review in Free-recall test. In other words, the differences among the note-taking conditions depend on the review strategy employed.

4. Discussion of Findings

This study investigated the effects of Cornell, Verbatim, Outline note-taking strategies and review on retrieval of lecture information by College of Education students. The results, as analyzed, indicated that the note-taking strategy employed by a learner has influence on his/her ability to retrieve information from lecture which is measured by his/her performance in Free recall, essay and recognition tests. In essence, the note-taking strategy employed by a learner is able to enhance or impair his/her performance in tests.

The finding that Cornell – note taking is the most effective strategy (of the 3 note-taking styles investigated), in enhancing information retrieval is important. Outline note-taking group also performed better than Verbatim note-takers. The reasons for the high test performances are not far-fetched. Cornell and Outline note-takers were able to utilize their cognitive processes in transforming information received into meaningful codes. As suggested by Pardini, Domizi, Forbes and Pettis (2005), strategies which encourage active processing of information will help students learn effectively. Also, the two groups (Cornell and Outline) recorded main points in their notes, using their own words. Cornell note-takers were able to obtain the highest performance because they took more organized notes and made use of an active in-built review strategy. This finding goes to justify the proposal of Randall (2004) that using a systematic approach to the taking of notes can enhance understanding and remembering of lecture content. Verbatim note-taking was found to be the least effective in enhancing retrieval. A plausible explanation for the result is that in recording notes word – for – word, the Verbatim note-takers were distracted; they were unable to pay adequate attention to the key points of the lecture and so encoding was greatly impaired. What was not initially encoded and stored cannot be retrieved from memory.

Generally, those who reviewed their notes were found to perform better than those who did not review. This is supportive of the external memory function of notes (Putnam et al 1983; Henk & Stahl, 1985). The indication is that note-reviewers derived benefit from both functions of note-taking while those who did not review were unable to make use of notes as a memory aid. The note reviewers had additional opportunity to practice received

information before a test. This helped in strengthening the storage of such information in STM and strengthened subsequent retrieval. The findings of this study suggest that the two functions of note-taking are important. Findings on the interaction effect of note-taking style and review are revealing. The significant interaction effect for Free-recall implies that the performance of Cornell, Outline and Verbatim note-takers in essay test will depend on the review strategy employed. In other words, what is retained and retrieved in a lecture is dependent on taking of notes, the strategy used in taking notes as well as rehearsal of such information.

5. Conclusion

This study investigated the effects of note-taking strategies and review on College of Education students' retrieval of information. The study showed that the note-taking strategy a learner adopts greatly influences retrieval. Cornell note-taking was found to be the most beneficial to the learner in facilitating retrieval. Cornell note-taking strategy, hitherto used in the West has been tested and found to be very effective in information retrieval in a Nigerian population. As such, students need to be taught how to make use of this note-taking strategy. Also, review was found to influence learning. Learners need to be taught the importance of note review, since it strengthens the linkage between the encoded material and its retrieval.

6. Recommendations

 The following recommendations are made:
1) Students should be trained in note-taking skills and the use of effective note-taking strategies like Cornell and Outline, which can enhance retrieval of information. Presently, Cornell note-taking is relatively unknown in Nigeria. Use of Cornell notes will develop critical thinking in students through self questioning and help to internalize structure. Students' notes will also have memorable appearance that can enhance retrieval. Teachers and students should be trained in the use of Cornell note-taking strategy..
2) Teachers should teach for retention and retrieval by giving cues about what is important to aid students in identifying main points of a lecture.
3) Students should be encouraged to have systematic review of their notes to aid information retrieval.
4) Students should be dissuaded from taking verbatim notes in a lecture. Since verbatim
5) Note-taking tends to interfere with the consolidation period and so depresses retrieval, students should be guided to use other effective note-taking strategies that will encourage the recording of main points of a lecture.
6) Guidance Counsellors and Educational Psychologists should make use of these findings to counsel students on study skills that will promote information retrieval and enhance academic performance.

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