

IMPROVING INSTRUCTION FOR STUDENTS WITH LEARNING DISABILITIES:  
THE PAUSE PROCEDURE

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## ABSTRACT

It is generally acknowledged that students with learning disabilities have difficulty meeting the course expectations of content classes in which they find themselves. Many students with learning disabilities display a broad array of performance problems and few appear to be prepared to meet the expectations of secondary or post-secondary education (Deshler et al, 2001). Many educators are searching for ways to meet the demands of educating all students, within the time, energy, and financial constraints inherent in public education. A number of instructional strategies have been advanced to assist both educator and student. However, any proposed instructional strategy must face two questions: Is it practical (will the teacher/student use it)? Does it improve student performance?

The focal point of this creative project was to test the usability and efficacy of the pause procedure. Two junior high school teachers (one special educator and one history educator) were trained in and implemented the pause procedure in a United States History class containing normally achieving students and students with disabilities. Using an alternating treatment design, immediate posttests were taken at the end of each instructional period and delayed posttests followed two weeks later. Improved performance occurred for all students in the immediate recall condition and mixed results occurred in the review condition. Questions were investigated concerning whether the pause procedure benefited normally achieving students and students with disabilities and whether this procedure was liable to be implemented broadly in a public school situation.

## INTRODUCTION

Students with learning disabilities face seemingly insurmountable challenges in content area classrooms, such as social studies, geography, health, and history. Many mildly handicapped students struggle to understand and remember concepts presented in these classrooms (Ellis & Lenz, 1990). While many benefits are derived from inclusion, educators are increasingly aware of the struggle and poor performance students with learning disabilities experience in the general education classroom (Reisberg, 1998). Ellis (1994) states that “Learning content-area subjects such as social studies, geography, or history, as well as meeting the writing expectations of secondary schools are two significant challenges for many adolescents with mild learning handicaps” (p.169). Both general and special educators easily recognize students with specific learning disabilities and language disorders who struggle academically to keep pace with their age-level peers (Bulgren, et al, 1988; Simmons & Kameenui, 1996). As inclusion has become a primary method of service delivery for students with special needs opportunities such as broad peer association and exposure to the state core curriculum have increased. It must also be noted that inclusion has resulted profound discrepancies between what is expected and what is achieved, in the regular education class, by students with learning disabilities (Fuchs & Fuchs, 1998; Polloway, et al, 2003; Schumm & Vaughn, 1998 ). Students with learning disabilities who are served in general education classes for large portions of each day show increasing discrepancies between what they are scheduled to achieve and what they actually achieve, leading to an inability to meet the demands of content-area courses and thus to discouragement and school disengagement (Deshler et al, 2001).

Noting the difficulty experienced by students with learning disabilities in inclusion classes, Deshler, et al (2001) indicates that too often simple placement in general education core subjects is considered sufficient to mean access to the general curriculum. This is inadequate to meet the intent of IDEA '97 as students with learning disabilities continue to fail. As it is aptly stated by Bulgren et al (1988), there is a call “for the restructuring of education whereby effective practices from special education are joined with those of general education to form a unified system that meets the needs of all students” (p. 3). As Kauffman (1999) indicates, high quality instruction is the key to success for students with learning disabilities.

Instruction may be modified in two ways. The first is the training of students with learning disabilities in strategies that will assist them to acquire and retain information (Ellis et al, 1991). The second is in altering the way instruction is presented so that students of all abilities are better able to access and preserve the information given (Bulgren et al, 1988; Deshler et al, 2001; Ellis, 1994).

Despite the acknowledged benefits of many instructional techniques, teachers are often resistant to changing their methods (Boyle, 2001; Hughes & Suritsky, 1993; Schumm & Vaughn, 1998). As Bulgren et al (1988) notes “secondary level teachers are generally overextended and cannot readily accommodate radical changes in their established teaching procedures” (p. 4). Hudson (1997) indicates that “Teacher interventions must not only be examined in terms of how they influence students’ performance, but also in terms of the palatability to teachers (p. 30). Consequently, in addition to being effective in increasing acquisition and retention of content knowledge for all students, any instructional alterations “must also involve low response costs for teachers, in terms of both preparation time and adaptability to existing classroom routines” (Bulgren et al, 1988, p. 4).

An instructional technique that may assist both high and low achieving students to gain and retain information presented in lectures is the pause procedure described by Rowe (1983). Additionally, the pause procedure meets the requirement of practicality, as it is easy to implement and requires little time and effort on the instructor's part (Ruhl et al, 1990).

The pause procedure consists of at least three two-minute pauses in the lecture at 8-12 minute intervals. Di Vesta and Smith (1979) used 7 minute intervals while Ruhl et al (1987) used 12-18 minute intervals. Despite the variation in interval length both studies produced similar results and improvement in immediate and long-term recall. Rowe indicates that intervals should be used by small groups to discuss the lecture material which has immediately preceded the pause. He specified that no questions are to be asked of the instructor during the pause.

However, various researchers have included different activities during the pause. In a 1979 study Di Vesta and Smith provided 3 varied activities during the pause. The first was an irrelevant puzzle activity, the second was small group discussion, and the third was individual review. They found significant differences in the results of the three treatments. Group discussion produced the best recall ( $M=10.43$ ), individual review was next ( $M=8.44$ ), and students performing the puzzle activity had the least accurate recall ( $M=7.21$ ). They also investigated the placement of the pauses and found that randomly placed pauses during the lecture, rather than before or only after produced the best effect.

A number of studies support the use of the pause procedure in assisting students to acquire and retain information from lecture. A study by Ruhl et al (1990) was done to ascertain the effect of the pause procedure on student recall. The subjects were 15 students with learning disabilities and 15 students without learning disabilities attending college. The students were divided into two groups (Group A and Group B) based on preference for meeting times. A three

phase experiment was designed. In phase one both groups were administered the lecture without pauses and an immediate free recall test and objective test were administered following the lecture. In phase two Group A received the lecture with pauses inserted, while Group B received the lecture without pauses. Again, tests were administered. In phase three both groups received the lecture with pauses inserted and tests were administered. At the beginning of each session following the first one, subjects were administered a free recall test on the information presented in the previous session. Collectively, the results of the between-group comparisons show that the pause procedure appreciably enhanced the immediate free recall and the objective test performance, but not the long term free recall. Students has been instructed not to study and the authors surmise that the long term free recall was unaffected due to the lack of study which moves material from the short term memory to the long term memory.

In a study by Ruhl and Suritsky (1995) teacher-produced outlines were added to the pause procedure. The subjects were 30 undergraduate and 3 graduate students with either communication or learning disabilities (C/LD) divided into three groups. The O group received only an outline and was neither trained in, nor used the pause procedure. The P group did not receive the outline but was trained in and used the pause procedure. The O/P group received a teacher-prepared outline of the lecture and was trained in and used the pause procedure. The students were placed in a typical university classroom with peer confederates who also did/did not receive the pause training (this was done because it was assumed that in a typical classroom, students with learning disabilities would be mixed with non-disabled students). Instruction in the use of the pause procedure was given for 15 minutes prior to the video taped lecture. An immediate free recall test was administered following the lecture. Notes were also collected to assess for completeness. For free recall, Group P was superior to both Group O/P and O. For

completeness of notes Group P and Group O/P were equal and both superior to Group O. Essentially, the results showed that the pause procedure alone produced more free recall benefit for students with C/LD than either the pause combined with the outline or the outline alone.

A study done by Hughes et al (1986) using 7<sup>th</sup> grade science students that were either low achieving (LA) or high achieving (HA) found that the use of the pause promises improved performance in students who struggle to gain and retain information. Additionally, they indicate that the pause is comparatively easy to implement with a whole class of students. Data was collected on factual recall. Students were monitored for baseline and then during intervention. No reversal was included in the study. Seven of 8 students identified as LA showed positive changes in factual recall when the pause procedure was introduced. Additionally participants identified as HA improved their factual recall scores. For HA subjects, 7 of 8 had higher mean scores.

Instituting the traditional pause procedure with middle level school students who have disabilities has not been widely studied and poses some concerns. Will middle school students with learning disabilities actually engage in the small group discussion? Will the general education students in the group include the student with learning disabilities in the face of that student's possible resistance and/or lower skills? Will discussion focus on the material? These are serious concerns and two items indicate that the pause procedure may need to be adapted. P.J. Hudson (personal communication, August 13, 2003) indicates that as she studied the pause procedure in secondary education settings she achieved clearly positive results only when using pause activities that were teacher directed. Secondly, knowing the particular propensities of the students that will participate in the study I believe that an unguided pause would not result in a positive outcome.

Hudson (1997) studied these particular concerns. She compared a pause procedure in which the student reviewed notes independently and a pause procedure in which the teacher guided the review. The study used 18 sixth and seventh grade students who were served one to three periods per day in a resource room and met state criteria for a learning disability or communication disability. The students were randomly assigned to an experimental or control group. In the experimental group the lecture was divided into segments followed by teacher-guided practice (TGP), which included oral true/false statements or specific questions concerning the preceding segment. The teacher attempted to get a high percentage of students responding. Teacher feedback was immediate for both correct and incorrect answers. The control group received a matched condition in terms of lecture and practice. However, during the practice time students were directed to study their notes independently and when finished to put their pencil down and look at the teacher. Results of this study showed statistically significantly better performance by the experimental group who used the TGP.

The modified pause procedure, then, may be more suitable for implementation in the middle school setting. Therefore, the aim of this project was three-fold; (1) to determine the practicality of the pause procedure being introduced into middle school classrooms that include students with disabilities, (2) to determine the effects of a teacher guided pause procedure, for middle school students with learning disabilities and (3) to determine the effects of a teacher guided pause procedure, during lecture, for middle school students who are **not** identified as having learning disabilities.

## METHOD

### *Participants and Setting*

The study was conducted in a public school of approximately 1100 students, located in a large district in north-central Utah. The community generally represents a blue collar work force and students with disabilities represent 17% of the school population. All seventh and eighth grade students are placed on “teams” of approximately 120 students. Each team receives instruction in core curriculum subjects including math, social studies, English, and science. The team students are served by four content teachers and a special education teacher.

The participants in this study are members of one United States History class and were drawn from 120 students who belong to a specific eighth grade team. This class is cooperatively taught by the team history teacher and the team special education teacher. The instructors have previously taught together and exhibit good joint planning and working skills.

Students were included on the basis of (1) membership in the co-taught history class, (2) willingness to participate, and (3) permission of parents to be included in the study. All students who met the criteria were included. Of the thirty students who were possible participants in the study twenty-six were willing to participate and returned parent permission. Twelve of the participants who met the criteria are identified as special education students; ten are identified with learning disabilities, one is identified as intellectually disabled, and one is identified as emotionally disturbed. Fourteen students were normally achieving, that is, they had no identified disability.

Normally achieving students were placed in class according to standard school registration procedures. Of the students with learning disabilities, some were placed in the class according to standard school registration procedures. Additional students with learning

disabilities were rescheduled through the team organization to receive social studies instruction during the class period in question in order to provide them with the opportunity to receive instruction in the cooperative teaching environment.

The classroom was a typical middle school room with individual desks. The class was eighty minutes long and met every other day from 1:25 P.M. to 2:45 P.M.

### *Instructional Content and Materials*

The history content was presented via lectures. Ten lectures were involved in the study. The subject of the lectures were: Words of Revolution, Important Battles of the Revolution, The Outcomes of the Revolution, Famous People of the War, The Articles of Confederation, The Constitutional Convention, Creation of the Constitution and Federalist vs. Antifederalist, Branches of Government, Separation of Powers, and The Bill of Rights and Amending the Constitution. The specific material in each day's lecture was determined by the classroom teacher. The instructors endeavored to avoid any overlap of the content across lectures in order to separate the quiz material effectively. Important information was depicted on the overhead and graphic organizers were provided to the students by teachers to assist in taking notes. Students were not required to take notes but notes were submitted to the teachers to be used as part of the students' grade for the term. Because notes were taken from the overhead rather than written freely by the students, use of notes was not allowed during the quizzes.

Twelve by twelve inch white boards were created for use by the students and white board markers and erasers were obtained to go with each whiteboard. The whiteboards served as the response vehicle during the pause, in order to encourage broad participation during the pause. This avoided the tendency for students to play "Russian Roulette" during the review, hoping

someone else would be called on. Each student was expected to produce an answer. Pause and quiz questions were drawn from the material covered during the pause, but the specific questions on quizzes were different from those used during pauses.

### *Dependent Variable*

Two dependent variables were measured: (1) immediate recall of lecture material and (2) long-term recall of material. Immediate recall items were measured using six quiz items which included multiple-choice, true/false, and short answer responses administered immediately following each lecture during the last 8 minutes of class. Material reviewed during the pause covered major concepts of the lecture.

Long-term recall was measured using four quiz questions (two multiple choice and two short answer) administered two weeks following the presentation of the material that it assessed.

Quizzes during the first five sessions consisted of six items that covered the material presented in the day's lecture. The sixth through the tenth quizzes contained the six immediate recall items on the daily lecture and the four long-term recall questions that corresponded with a lecture given two weeks previously. Quiz number six reviewed material from lecture number one, quiz seven reviewed number two, etc. Following the presentation of the tenth quiz, the eleventh through the fifteenth quizzes consisted only of the four long-term recall items. Each quiz was scored and recorded by the researcher. The pattern of immediate and long-term quiz items shown in table 1.

Session	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Immediate recall items	X	X	X	X	X	X	X	X	X	X					
Long-term recall items						X (1)	X (2)	X (3)	X (4)	X (5)	X (6)	X (7)	X (8)	X (9)	X (10)

*Table 1, Quiz Administration Schedule*

### *Independent Variable and Conditions*

The independent variable was the use of a pause procedure adapted from the original form described by Rowe (1983). This study included two conditions, pause and control.

In the control condition the teacher presented the lecture in segments consisting of key concepts with supporting material. Notes were displayed on the overhead and students were able to copy them to their own paper. Notes on the overhead were organized in such a way as to visually highlight the key concepts. No pauses were incorporated in the lecture during the control condition.

In the experimental condition the lecture was presented in a style that was as consistent as possible with that used in the control condition with the exception of the insertion of pauses. The lecture was presented in segments consisting of key concepts with supporting material. As with the control condition the overhead was used to accentuate those concepts. At the end of each key section, students were instructed to turn their notes over on their desks and pick up their white boards. Questions pertaining to the previously covered section of the lecture were asked and students wrote the answers on their white board and held them up. The teachers then provided feedback and correction. If an answer was wrong, the teacher redirected the student and asked

for another answer. Each lecture in the experimental condition consisted of three sections of material followed by a 3-4 minute pause with the teacher-guided review. Each section of the lecture covered a key component of the day's subject, i.e. under the three branches of government a pause followed the executive, legislative, and judicial sections. Lecture length ranged from 40 minutes to 52 minutes.

### *Design*

An alternating treatment design was used to compare the scores obtained by the students on pause and no-pause days. A coin was flipped to determine which condition would start. The experimental condition came up first. Table 2 shows the complete order of presentation of control and experimental conditions.

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Session 10
Pause	X		X		X		X		X	
No-pause		X		X		X		X		X

*Table 2; Order of Pause and No-pause*

## RESULTS

In order to assure that absences did not bias the results across conditions, sessions were paired (i.e., session 1 and 2 were a pair, sessions 3 and 4 were a pair, and so on) and data were analyzed only for students who were present for both halves of the pair. For example, if a student missed session 4 her data for session 3 was eliminated as well. Thus, each student made equal contributions to both conditions.

Figure 1 shows the results of the immediate recall quizzes for the group. In the first pair the control condition is slightly superior to the experimental condition. In every other pair the pause produced higher quiz scores than the no-pause condition.

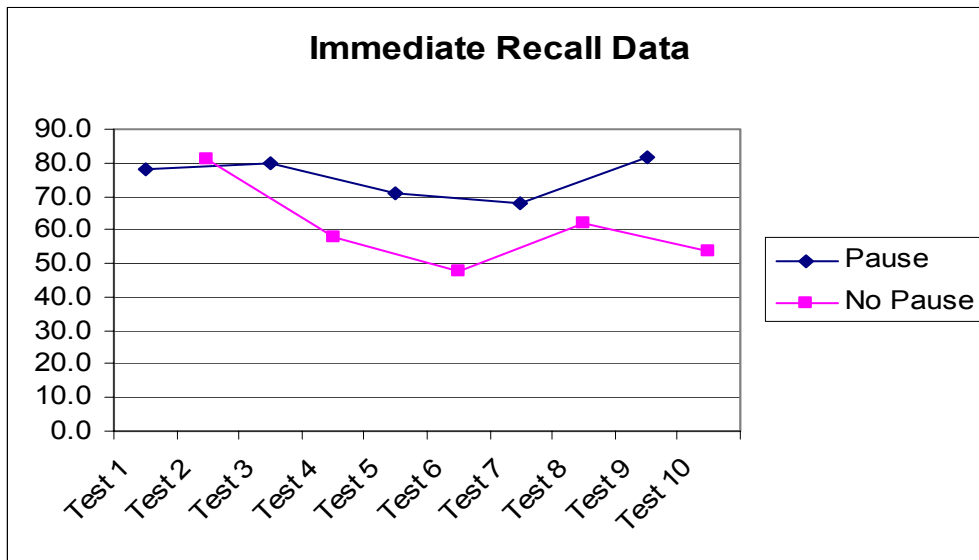


Figure 1; Results of Immediate Recall Quizzes

Table 3 displays the descriptive statistical data for each pair of the immediate recall quizzes. In each pair, except the first, a majority of the students scored higher in the pause condition. A large percentage of individual students scored higher in the experimental condition in each pair.

	Days				
	<u>1 &amp; 2</u>	<u>3 &amp; 4</u>	<u>5 &amp; 6</u>	<u>7 &amp; 8</u>	<u>9 &amp; 10</u>
N	19	20	19	22	23
Pause Mean	78.2	79.8	71.1	68.2	81.5
Control Mean	81.1	57.8	47.9	62.3	53.5
Difference between means	-2.9	22.0	23.2	5.9	28.0
% of students who scored higher in pause condition	31.5%	75%	89.5%	54.5%	95.6%

*Table 3; Data for Paired Immediate Recall Quizzes*

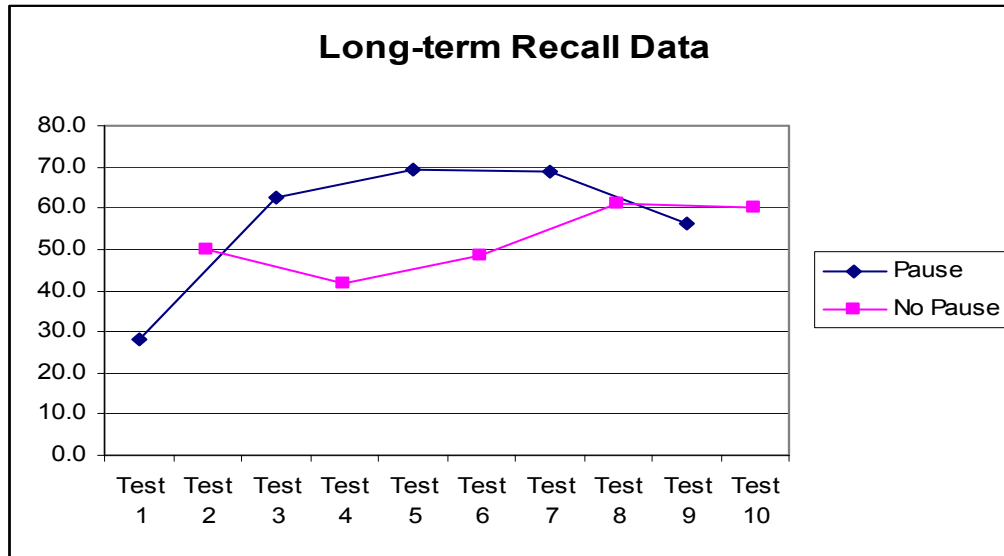
Table 4 shows the individual students' mean difference between the pause and the no-pause condition. Each normally achieving student (NAS) showed better scores with the pause. The mean improvement for these students was 13.1 percentage points. The one sample student with emotional disturbance performed better by 33.8 percentage points in the pause condition and the one student with intellectual disability (SID) performed better by 5 percentage points. Of the ten students with learning disabilities (SLD) nine were more successful in the pause condition. Students with learning disabilities performed better in the pause condition by 16.0 percentage points. Each individual but one received overall improved scores with the pause. If translated into letter grades, the improvement ranges from one-half grade to three.

Student Learning Designation	Number of Paired Samples	Pause Mean	No-Pause Mean	Mean Difference
NAS	3	88.3	65.0	23.3
NAS	3	98.3	85.0	13.3
NAS	4	96.3	77.5	18.8
NAS	4	90.0	78.8	11.3
NAS	4	97.5	80.0	17.5
NAS	4	82.5	67.5	15.0
NAS	4	77.5	63.8	13.8
NAS	5	77.0	62.0	15.0
NAS	5	75.0	68.0	7.0
NAS	5	78.0	53.0	25.0
NAS	5	88.0	84.0	4.0
NAS	5	80.0	70.0	10.0
NAS	5	98.0	83.0	15.0
SED	4	85.0	51.3	33.8
SID	4	32.5	27.5	5.0
SLD	3	53.3	35.0	18.3
SLD	3	46.7	38.8	7.9
SLD	3	85.0	55.0	30.0
SLD	3	75.0	60.0	15.0
SLD	4	80.0	50.0	30.0
SLD	4	56.3	37.5	18.8
SLD	4	67.5	52.5	15.0
SLD	5	78.0	52.0	26.0
SLD	5	45.0	51.0	-6.0
SLD	5	62.0	42.0	20.0

*Table 4; Individual Results for Immediate Recall Quizzes*

Results for the long-term recall are based on all students who were present for each pair of review tests and had attended both of the corresponding lectures.

Figure 2 shows the results of the long-term recall quizzes for the group. While not as definitive as the data from the immediate recall quizzes, there appears to be some improvement in retention for some students in the experimental condition.



*Figure 2; Results of Long-term Recall Quizzes*

Table 5 displays the descriptive statistical data for each pair of the long-term recall tests. The majority of the individual students scored higher in only two of the five opportunities. However, when looking at individual results for each student (see figure 8), the majority of students improved their overall performance during the pause sessions. It appears that the pause coupled with the method of review may improve long-term recall.

	Days				
	<u>1 &amp; 2</u>	<u>3 &amp; 4</u>	<u>5 &amp; 6</u>	<u>7 &amp; 8</u>	<u>9 &amp; 10</u>
N	17	18	18	20	20
Pause Mean	27.9	62.5	69.4	68.8	56.3
Control Mean	50.0	41.7	48.6	61.3	60.0
Difference between means	-22.1	20.8	20.8	7.5	-3.7
% of students who scored higher in pause condition	6%	55.6%	66.7%	35%	45%

Table 5; *Data for Paired Long-term Recall Quizzes*

Table 6 shows the individual students' mean difference between the pause and the no-pause condition. Of the thirteen normally achieving students nine showed improved scores with the pause, one showed neither improvement nor decline and three performed better in the no-pause review condition. The mean improvement of normally achieving students in the long-term recall quizzes was 6.7 percentage points. The student with emotional disabilities showed improvement in the pause condition of 8.3 percentage points, and the student identified as intellectually disabled showed improvement of 18.3 percent based on one correct answer within all paired long-term recall quizzes in which he participated. Of the ten students with learning disabilities five showed at least some improvement in the pause condition. Two students performed equally in both conditions and scores were low in both cases. Three students in this group performed better in the no-pause condition. The mean improvement for students with learning disabilities was .9 percentage points.

Student Learning Designation	Number of Paired Samples	Pause Mean	No-Pause Mean	Mean Difference
NAS	2	100.0	62.5	37.5
NAS	3	100.0	91.7	8.3
NAS	3	50.0	33.3	16.7
NAS	4	56.3	25.0	31.3
NAS	4	93.8	81.3	12.5
NAS	4	93.8	87.5	6.3
NAS	4	100.0	75.0	25.0
NAS	4	75.0	75.0	0.0
NAS	5	55.0	50.0	5.0
NAS	5	50.0	70.0	-20.0
NAS	5	75.0	70.0	5.0
NAS	5	75.0	90.0	-15.0
NAS	5	65.0	90.0	-25.0
SED	3	58.3	50.0	8.3
SID	4	18.8	0.0	18.8
SLD	1	0.0	50.0	-50.0
SLD	2	8.3	8.3	0.0
SLD	2	75.0	62.5	12.5
SLD	3	50.0	33.3	16.7
SLD	3	8.3	25.0	-16.7
SLD	4	68.8	37.5	31.3
SLD	4	43.8	31.3	12.5
SLD	4	31.3	18.8	12.5
SLD	4	25.0	25.0	0.0
SLD	5	30.0	40.0	-10.0

*Table 6; Individual Results for Long-term Recall Quizzes*

## DISCUSSION

The goal of this research was to confirm the value of the pause procedure in a middle school classroom that includes students with disabilities. The research looked at both immediate and long-term recall, and the possibility that the use of a pause might be implemented by content teachers. The results of the research demonstrate that the pause has positive outcomes for

immediate recall for both normally achieving students and students with disabilities. Long-term recall shows little, if any, effect.

Due to the varied nature of the content it was impossible to structure each lecture in an identical manner. These unavoidable differences in lecture style and content undoubtedly contributed to day-to-day variations in scores. Nevertheless, as a result of the alternation of conditions, it appears to be quite unlikely the quality of lectures was systematically different in the two conditions and that this variation led to a better showing for either the pause or the no-pause condition.

As the study progressed it became apparent that the white boards were not only a vehicle for encouraging broad response, but a tool to encourage participation and engagement. The students enjoyed using the white boards, showing their answers, and receiving feedback. They did not mind finding a correct answer to replace an incorrect answer. Whether the white boards would continue to be as engaging in a daily use situation is a matter for further study. It was obvious that the white board response system assisted the teachers in encouraging student involvement and thus may have accounted for some of the immediate recall results.

Knowing that there would be a quiz at the end of each session may have accounted for improved attention and scores. If quizzes did have this effect, it would be expected to affect both conditions equally, and therefore could not account for the differences between conditions. The effort required to return the students' quizzes and re-collect them became unmanageable, so after the first two, we did not return quizzes or inform students of their results. Receiving positive feedback from the instructor or from scores may result in improved performance for most students, including students with disabilities who are often not used to success. For this reason,

returning the quizzes may have resulted in further improving scores as students noted their own progress.

The long-term recall scores showed little improvement for the experimental over the control condition. It may be interesting and profitable to study the effects of a pause early in the lecture that reviewed material from previous lectures. This may encourage or assist in moving material from the short term memory to the long term memory.

The most disappointing part of the study was the content teacher's reaction to the pause and the white boards. Though she was very impressed with both features, and asked to keep the white boards, and recognized improved retention, she has only used the white boards twice in the following four weeks. She feels that she is constantly pulled between whether to cover some of the content well, or all of the content briefly. It takes 9-12 minutes of instructional time to use the pause effectively. Whether to use that time to review the covered material and make sure the students understand or to cover additional material and leave understanding to chance appears to be a continuing issue. Use of the pause in a traditional forty-five minute class would use a third or more of the total instruction time. This would concern virtually all teachers. This dilemma may be able to be resolved by comprehensive vertical teaming or perhaps by revision to the core curriculum by state committees in order to reduce the curriculum demands.

This study appears to indicate that the pause has tremendous potential. The results on the immediate recall quizzes indicate that the pause assists students in focusing and recalling pertinent information. The mean improvement of all students of 18.8 percentage points is an important gain. Work should be done to improve long-term recall. As mentioned, the pause may be a vehicle for improving long-term recall. The goal would be to encourage its execution generally. Instituting the pause in public schools will probably be challenging. Special

educators could be the medium through which the pause might be brought into general use.

Through cooperative teaching and involvement on professional development committees the research may be disseminated and incorporated.

## REFERENCES

- Boyle, Joseph R. (2001). The effects of strategic note taking on the recall and comprehension of lecture information for high school students with learning disabilities. *Learning Disabilities Research & Practice*, Aug2001, Vol. 16 Issue 3 p133-141.
- Bulgren, J., Schumaker, J.B., & Deshler, D.D. (1988). Effectiveness of a concept teaching routine in enhancing the performance of LD students in secondary-level mainstream classes. *Learning Disabilities Quarterly*, Winter88, Vol.11, p3-17.
- Deshler, D.D., Schumaker, J.B., Lenz, B.K., Bulgren, J.A., Hock, M.F., Knight, J. et al (2001). Ensuring content-area learning by secondary students with learning disabilities. *Learning Disabilities Research & Practice*, May2001, Vol. 16 Issue 2, p93-109.
- Di Vesta, F. J., & Smith, D. A. (1979). The pausing principle; increasing the efficiency of memory for ongoing events. *Contemporary Educational Psychology*, Vol. 4, p288-296.
- Ellis, E. S. (1994). Integrating writing strategy instruction with content-area instruction: Part 1. *Intervention in School and Clinic*, Jan94, Vol.29 Issue 3, p169-180.
- Ellis, E.S., Deshler, B., Lenz, B. K., Schumaker, J. B., & Clark, F.L. (1991). An instructional model for teaching learning strategies. *Focus on Exceptional children*, Vol. 23 No. 6, p1-23.
- Ellis, E. S. & Lenz, B. K. (1990). Techniques for mediating content-area learning: Issues and research. *Focus on Exceptional Children*, Vol. 22 (9) p1-16.
- Fuchs, L. S., & Fuchs, D. (1998). General educator's instructional adaptation for students with learning disabilities. *Learning Disabilities Quarterly*, Winter99, Vol.13, p23-33.
- Hudson, Pam (1997). Using teacher-guided practice to help students with learning disabilities acquire and retain social studies content. *Learning Disabilities Quarterly*, Winter97, Vol.20, p23-32.
- Hughes, C. A., Hendrickson, J. M., & Hudson, P.J. (1986). The Pause Procedure: Improving factual recall from lectures by low and high achieving middle school students. *International Journal of Instructional Media*, Vol. 13 No. 4, p217-225.
- Hughes, C.A., & Suritsky, S.K. (1993). Note taking skills and strategies for students with learning disabilities. *Preventing School Failure*, Fall93, Vol.38 Issue 1, p7-11.
- Kauffman, J.M. (1999). Commentary: Today's special education and its message for tomorrow. *Journal of Special Education*, Winter99, Vol. 32 Issue 4, p244-254.

- Polloway, E.A., Epstein, M.H., & Bursuck, W.D. (2003). Testing adaptations in the general education classroom: Challenges and directions. *Reading and Writing Quarterly*, Apr2003, Vol. 19 Issue 2, p189-192.
- Reisberg, Leon (1998). Facilitating inclusion with integrated curriculum: A multidisciplinary approach. *Intervention in School and Clinic*, May98, Vol.33 No. 5 p272-277.
- Rowe, M. B. (1983). Getting chemistry off the killer course list. *Journal of Chemical Education*, Vol. 60 No. 11, p954-956
- Ruhl, K.L., Hughes, C.A., & Gajar, A.H. (1990) Efficacy of the pause procedure for enhancing learning disabled college student' long and short-term recall of facts presented through lecture. *Learning Disabilities Quarterly*, Winter1990, Vol.13, p55-64.
- Ruhl, K.L., Hughes, C.A., & Schloss, P. J. (1987). Using the pause procedure to enhance lecture recall. *Teacher Education and Special Education*, Vol. 10 No. 1, p14-18.
- Ruhl, K.L. & Suritsky, S. (1995). The pause procedure and/or an outline: effect on immediate free recall and lecture notes taken by college students with learning disabilities. *Learning Disabilities Quarterly*, Winter95, Vol. 18, p2-11.
- Schumm, J.S. & Vaughn, S. (1998). Introduction to special issue on teachers' perceptions: issues related to the instruction of students with learning disabilities. *Learning Disabilities Quarterly*, Winter99, Vol.13, p55-64.
- Simmons, Deborah C., Kameenui, Edward J., (1996). A focus on curriculum design: When children fail. *Focus on Exceptional Children*, Mar96, Vol. 28 Issue 7
- Suritsky, S.K., & Hughes, C.A. (1991). Benefits of note taking: Implications for secondary and post-secondary students with learning disabilities. *Learning Disability Quarter*, Winter1991, Volume 14, p7-18.