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The Effects of Using the Modified Neurological Impress Method to Improve the Fluency of Second and Third-grade Low Achieving Readers

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THESIS

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Abstract

The purpose of this study was to examine the effects of using the modified neurological impress method to improve the reading fluency of five low achieving second and third grade students. All of the subjects attended a rural public elementary school in western New York. Students in the study received remedial reading support in addition to the modified NIM sessions. The study was conducted over an eight-week period. The researcher trained four parent volunteers and a classroom monitor to implement the modified NIM and recording procedures. Parent volunteers met with students four times a week for approximately 10 to 15 minutes. Baseline measurements of reading rate and word accuracy were compared with post intervention measurements to determine if any changes occurred. Of the five subjects in this study, all showed gains in their reading rate, with an average gain of 36%, or 24 words per minute. The students' average gain in word accuracy was 4%. Anecdotal evidence revealed positive changes in all of the participants' confidence and motivation toward reading during the sessions.

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Chapter 1

Statement of the Problem

Purpose

The purpose of the study was to examine the effects of using the modified neurological impress method to improve the reading fluency of five low achieving second and third grade students.

Introduction

The goal in education is to enable all students to achieve personal and academic success. To a great degree, a student's success is directly related to reading achievement. Cunningham and Stanovich (1997) report on the many positive outcomes of early reading success. Reading contributes to the development of a wide range of cognitive abilities including growth in vocabulary, verbal skills, and general knowledge. One of the most important outcomes is that students benefit from the "reciprocal influences" of early reading acquisition. Students who experience success with reading are more likely to read more often which contributes further to cognitive growth. These outcomes can significantly impact a student's future by encouraging life long reading habits that will

continuously enrich their lives, and contribute to future employment and educational opportunities (Greenberg, cited in Gerdes, 2000, p. 1).

A common concern for many educators involves finding efficient and effective methods for students who experience difficulty when they are learning to read.

Need for the Study

Torgesen (1998) reports that "children who get off to a bad start in reading rarely catch up" (p. 32). The negative effects of this slow start become more problematic and devastating over time (Stanovich, 1986). When children in elementary school fall behind acquiring early reading skills, intensive interventions are necessary to bring them up to grade level (Allington & McGill-Franzen, cited in Torgesen, 1998, p. 32). Many low achieving readers are not identified as learning disabled; however, they are unable to read grade level material successfully. Their oral reading lacks the quality of fluency that is evident with successful readers. Oral fluency is characterized by smooth, accurate and expressive oral reading (Rasinski, 1989).

Fluency instruction has not been considered a critical part of reading instruction. Rasinski and Zutell (1991) report that many teachers

tend to concentrate on word recognition, vocabulary development and comprehension. They view fluency as an outcome of appropriate development in these areas instead of a separate aspect of reading. The result is that many children who experience difficulty with disfluency receive instruction in subskills, rather than implementing methods that improve fluency.

Children who are slow to develop oral fluency are at a great disadvantage. They become deprived of the knowledge gained from reading, and their exposure to vocabulary is more limited because they read less than children who are more fluent (Nathan & Stanovich, 1991). Improvement of reading abilities requires practice. Dysfluency causes low achieving readers to read less which contributes to their lack of progress (Allington, 1980). These students often become reluctant readers and develop negative self-concepts because of the difficulties they experience with the reading process (Chomsky, 1976).

Mastropiere, Leinhart and Scruggs (1999) further describe how disfluency affects a reader's comprehension by stating that" a slower reading rate leaves fewer cognitive resources available to process meaning so that it becomes difficult to remember and integrate ideas in the text" (p. 279). They suggest that comprehension training can be

effective; however, it is incomplete without techniques to directly improve the oral fluency of struggling readers.

Two techniques that have been used successfully to promote the reading fluency of learning disabled students are the Repeated Reading Method (Samuels, 1979) and Neurological Impress Method (Heckeleman, 1986). A combination approach outlined by Downs and Morin (1990) utilizes both of these methods. The modification of the Neurological Impress method (NIM) will be used in this study. Many low achieving readers receive corrective or remedial support that focuses on teaching strategies for decoding and comprehension. Although this support is beneficial, it may not be enough to enable them to catch up to their peers. It is important to find methods that are effective and easy to implement to improve the reading fluency of low achieving readers.

Limitations

The students who participated in the study were from a rural, northeastern community and represent only one socioeconomic group. There were only five students from second and third grade. This provides limited information from which to draw conclusions. The students who participated in the study received daily remedial reading

support in addition to the modified NIM which makes it difficult to determine which interventions were solely responsible for reported gains in reading fluency. Tutors who conducted reading sessions with students were parent volunteers. They were trained for the specific purpose of administering the modified NIM. The parent volunteers did not have professional training or knowledge in the area of reading to meet the multidimensional needs of students who experience difficulty with reading.

Chapter II

Review of the Literature

Purpose

The purpose of this study was to examine the effects of using the modified neurological impress method to improve the reading fluency of five low achieving second and third grade students.

Importance of Fluency

In the field of reading instruction, there has been significant research to support the need to improve the reading fluency of struggling readers. Researchers have examined the reading abilities of high and low achieving readers. Their observations revealed an important factor that contributes to early reading success; competent readers exhibit oral reading fluency which involves the ability to decode words with accuracy and speed (Johns, 1984; La Berge & Samuels, 1974). Reading researchers have investigated fluency by examining the reading rate (words per minute) and accuracy rate (word recognition) during oral reading. A target rate of 100 words per minute on independent reading material is suggested (Dahl, 1974; Dowhower, 1987).

Zutell and Rasinski (1991) describe the three elements of fluency on their multidimensional fluency scale. During oral reading teachers should observe pacing (reading rate), smoothness (automatic word recognition) and phrasing (expressive reading). Dowhower (1991) discusses the element of phrasing or prosody as " the ability to read a text orally using appropriate pitch, stress, and juncture with natural intonation and phrasing upon the written text" (p. 166). Teachers frequently refer to this as the ability to "read with expression." As students read text orally, they need to be able to use syntactic knowledge to identify prosodic cues (text and structure of written text). Low achieving readers frequently have difficulty recognizing prosodic cues because "written language lacks definitive signs as to what constitutes natural phrasing (Allington, cited in Richards, 2000 p. 534). Three instructional techniques that have been shown to facilitate prosodic reading in the classroom setting are repeated reading, text segmenting, and auditory modeling (Dowhower, 1991).

Fluency needs to be present in order to have adequate comprehension. Bloom (1981) reports that, " Mastery of any skill, whether a routine daily task or a highly refined talent, depends on the ability to perform unconsciously with speed and accuracy while

consciously carrying on other brain functions" (p. 94). La Berge and Samuels (1974) describe the characteristics of fluent readers in their theory of automatic information processing. Fluent readers decode text automatically, which leaves their attention free for comprehension. Poor readers are non-automatic in their decoding; their attention is focused on the process of decoding and their comprehension is insufficient. Samuels (1979) reports that an important goal is to help students reach automaticity in word recognition. Accurate and rapid word recognition and a reading rate that is equivalent or faster than a speaking rate identify automaticity. Oral reading is with expression and phrasing and comprehension are evident.

Starlin (cited in Downs & Morin, 1990) supports the important link between fluency and comprehension by stating that most students who are referred for reading comprehension problems do not understand what they read because they lack fluency and word recognition skills. A reader is unlikely to comprehend while reading at a slower rate because words are being read as isolated units rather than meaningful sequences (Dahl, 1974; La Berge & Samuels, 1974; Mathes, Simmons, & Davis, 1992).

Recent studies have revealed that "teachers have focused on word recognition, vocabulary development, and comprehension because these

are the goals in most basal readers. As a result, fluency is considered an outcome of the goals rather than a contributing factor" (Dowhower, cited in Richards, 2000, p. 535). Bear (1991) also supports this statement by reporting that "an emphasis on fluency instruction in reading programs may have been overlooked because of the focus on methods rather than an integrated developmental model of reading" (p. 150). Oral fluency should continue to be a goal of reading instruction and should be a major focus in the reading curriculum. (Allington, 1983; Anderson, 1981; Rasinski, 1989).

Methods for Improving Fluency

Several different methods have been used in remedial or corrective reading programs to improve reading fluency. Two methods will be the focus of this investigation. Both methods have reported successful results after experimental investigations and classroom applications. These methods are also easy to implement and classroom aides or volunteers can be trained to conduct reading sessions (Anderson, 1981; Henk, Helfeldt, & Platt, 1986).

The Neurological Impress Method (NIM) is a remedial reading technique that provides an appropriate model of the reading process

(Heckeleman, 1966; 1986). Heckeleman (1966) describes NIM as a multisensory method using hearing, speech, sight and tactile modalities" (p. 411). An advantage in using this approach is that the attention of the student is focused in a manner that is not found in other remedial techniques. The NIM utilizes reinforcement techniques such as appropriate pacing, finger sliding and immediate feedback. This ensures smooth, accurate reading at an appropriate pace. Heckeleman (1986) reports that the increase in reading rate and amount of text that is read increase neurotransmitters in the brain that aid in memory storage.

The technique involves the teacher sitting slightly behind and to the right of the student. Sitting to the right of the student is suggested because it accesses the brain's center for learning language. The reading material should be at the student's easy instructional level and of high interest. It is placed so that the teacher can point to each word, sliding a finger along each line that is spoken. Teacher and student read aloud at a rapid rate, in unison. During each reading session, the emphasis is on smooth, accurate oral reading; no attention is given to pictures or contents of the story. The student is permitted to comment about the story, however the emphasis is on the reading. Positive comments about the student's reading can help to increase motivation. A goal is to read as

much material as possible in a 10-minute session. Heckeleman (1986)

suggests that NIM sessions take place daily and continue for a total of 8

to 10 hours. Improvement in fluency should be noticed within a total of 4

hours with a rise in achievement noticed at around the eighth hour of

instruction.

Another effective method that has been used to improve reading

fluency is the technique of repeated reading (Dowhower, 1989; Samuels,

1979). The method involves students rereading a passage until an

appropriate level of fluency is reached. Repeated reading can be

conducted with the assistance and modeling of a teacher, or it can be

unassisted where the students reread independently. The goal is to

provide students with enough oral reading practice to make decoding

automatic.

Repeated reading increases reading rate and accuracy and helps

students remember and understand what they read (Dowhower, 1989). In

a study conducted by Schreiber (1980), fluency gains made through

repeated readings are often transferred to new text. Moyer (1982)

suggests that gains in reading fluency occur because, " repetition of entire

passages gives poor readers the extra practice in using syntactic and

contextual cues as well as grapho-phonemic word structure" (p.621).

These improved skills are applied to the new reading material and reading fluency increases across new passages" (p.181).   Kann (1983) supports this view by stating that repetition of a passage is highly beneficial for disabled readers. He also suggests that NIM may not be as beneficial as repeated reading because students are constantly presented with new material that may provide too much visual stimuli for some disabled readers.

A technique outlined by Downs and Morin (1990) involves a modification of NIM. The approach combines the repeated reading and neurological impress methods to improve reading fluency. The goal is to provide low achieving readers with fluent models and to provide them with sufficient practice in order to improve word accuracy, reading rate and phrasing. The elimination of repetitions and hesitations and the specific monitoring and support also helps students to develop new confidence in their reading abilities. The modified NIM involves the identical instructional procedures as described by Heckeleman, however, before moving on to new reading material, the passage or text is reread by the student. During the rereading part of the session, the teacher continues to provide assistance by pointing to the words and by helping the student to maintain an appropriate pace.

Mispronunciations and unknown words may also be provided. Improvement in word accuracy and speed are documented and shared with the student.

Downs (1990) explains that discussing the student's progress is important. Sharing the data with the student helps to provide frequent and specific reinforcement and feedback for the learner, which helps them move toward fluency more rapidly.

Chapter III

Design of the Study

Purpose

The purpose of the study was to examine the effects of using the modified neurological impress method to improve the reading fluency of five low achieving second and third grade students.

Research Question

What changes will occur in students' word accuracy and reading rate after receiving training using the modified neurological impress method?

Definitions

Low achieving readers: A student who is experiencing difficulty with reading fluency, comprehension and is currently reading well below grade level (.5-1.5 years).

Modified NIM: A technique that is used to increase reading fluency that combines the Neurological Impress Method (Hecklemann, 1986) and Repeated Reading Method (Samuels, 1979).

Precision teaching chart: A form that is used during reading trials to record a student's word accuracy and reading rate. (Appendix A)

Oral reading fluency: Smooth, accurate and expressive oral reading (Rasinski, 1989).

Methodology

Subjects

The subjects in this study were five low achieving readers. Two of the students were 8 years old, three of the students were 9 years old. The subjects attended a rural public elementary school in western New York. The participants in the study were students in a heterogeneous second and third grade multiage classroom. The students in this study were experiencing difficulty with oral reading fluency and comprehension and were reading .5 to 1.5 years below grade level. One student was classified as learning disabled. All of the students received remedial reading support for a total of two hours a week in addition to the modified NIM sessions.

Materials

*Children's trade books: guided reading levels I-M

*Precision Reading Form

*Graphs to document changes in word accuracy and reading rate

*Binder

*Reading log sheets

*Reading passage for students' individual graphs

Procedures

The study was conducted for a period of eight weeks for a total of 32 tutoring sessions. Each tutoring session lasted 15 minutes per student. Prior to the first tutoring session, the researcher met with four parent volunteers and a classroom monitor to discuss the rationale of using modified NIM. Each parent volunteer was assigned a day to conduct tutoring sessions that took place daily Monday through Thursday. The classroom monitor was trained in the event that a parent volunteer was unable to attend on her day. The researcher met with the student participants to explain the program procedures and tutoring sessions. The researcher met with the parent volunteers to explain the implementation of the modified NIM technique and program procedures. The following outline contains the procedures that were conducted daily by the parent volunteers.

The Modified NIM

1. A text was selected at the student's guided reading level.

2. The book level, title, tutor initials and date were recorded on log sheets.

3. Parent tutor and student sat in a quiet location.

4. Parent tutor sat on the right hand side of the student and placed the book on the desk between them.

5. Parent tutor and student read the page together aloud. The student was instructed to follow along as the parent slid her finger under the words. They were instructed to keep up, even if some of the words were unknown. Parent tutors provided reassurance and praise for close approximation in keeping pace.

6. Instruction continued for 5-8 minutes. The last page was marked for the next day's session.

7. The student reread the portion of the text that was previously read while the parent tutor slid her finger under the words.

8. The text was sent home with the student and reread with their parents.

Every 7 days the student read a passage with the classroom monitor. Changes in reading rate and word accuracy were recorded on the

students individual graph. Evidence of ability to recognize prosodic cues was also recorded. This information was shared with the student and responses were noted. Also, an incentive system was established where the students would receive stickers for every book completed during the tutoring sessions.

Analysis of the Data

The researcher collected baseline data on each student's reading rate and word accuracy prior to beginning the tutoring sessions. Three samples of each student's reading rate and word accuracy were averaged to determine baseline measurements. At the end of the eight-week study, the researcher gathered final assessment scores of reading rates and word accuracy rates by averaging three reading samples. Word accuracy was determined by errors that included omissions, substitutions, insertions and mispronunciations and line skipping. Minor hesitations and self-corrections were not included. Reading rate was determined by number of word read per minute.

Baseline measurements of reading rate and word accuracy were compared with post intervention measurements to determine if any changes occurred. The researcher also reviewed and recorded parent

volunteers anecdotal notes based on observations during tutoring sessions. The researcher also noted student responses to improvements documented and shared on their individual graphs. Conclusions were drawn based on these findings.

Chapter IV

Results of the Study

Purpose

The purpose of the study was to examine the effects of using the modified neurological impress method to improve the reading fluency of five low achieving second and third grade students.

Analysis of the Findings

The subjects who participated in the study attended all sessions for a total of 33 sessions and completed 8 hours of tutoring. Fluency was measured by calculating reading rate in words per minute and word accuracy by percentage of correct sentences out of total number of sentences. Students' mean baseline and final assessment scores were compared to determine if any changes in reading fluency were observed. The results are shown below.

Table 1: Reading Rate Mean Baseline and Final Assessment Scores of the Subjects Measured in Words per Minute

Subject	Baseline Score	Final Assessment Score	Gains in WPM	%Gain
A	53	80	26	48%
B	57	76	19	33%
C	74	99	25	34%
D	72	102	30	42%
E	83	101	18	22%

Of the five subjects in this study, all showed gains in their reading rate.

The range in gains was from 22% to 48%, or 18 to 30 words per minute

(WPM). Their average gain was 36%, or 24 words per minute.

Table 2: Word Accuracy Mean Baseline and Final Assessment Scores of the Subjects Measured in percentages of Correct Sentences out of Total Number of Sentences in a passage

Subject	Mean Baseline score	Final Assessment Score	%Gain
A	79%	84%	5%
B	82%	86%	4%
C	85%	88%	3%
D	88%	91%	3%
E	83%	87%	4%

The mean baseline and final assessment scores indicate growth in word accuracy. The students' gains ranged from 3% to 5%. The average gain was 4%.

Discussion

Student "A"

This student was eager to participate in the study and he enjoyed working with his tutor. Student "A" was reading 1 year below grade level placement. Frequent hesitations, lengthy pauses during oral reading, and

a reading rate of 54 words per minute characterized his oral reading. He experienced difficulty keeping up with the tutor at the beginning of the reading sessions. He voiced only 2 out of 5 every five word and needed encouragement to continue. At the end of the study he was able to keep an appropriate pace and his phrasing improved immensely. His gain in word accuracy was 5% and 26 words per minute. He enjoyed receiving his stickers and bringing his books home to read to his family.

Student "B"

At the beginning of the study, Student "B" was a reluctant reader. His parents were very concerned because in spite of the extra reading support he was receiving at home and at school, he still disliked reading. He was also becoming negative about school. He reading level was 1 year below grade level placement. His oral reading was laborious and without expression. Student "B" listened to his tutor during the first session. As he grew more comfortable with the sessions, his anxiety lessened and improvements in his motivation were noticed. He looked forward to selecting books for his tutoring sessions. By the end of the study, his gains in reading rate increased from 57to 76 words per minute and his word accuracy grew by 4%. His parents, tutors and reading

teacher noticed that he appeared more confident in his reading abilities. His parents also reported that he was feeling better about school.

Student "C"

Student "C" looked forward to the tutoring sessions even though she disliked reading. She frequently exhibited avoidance behaviors during reading assignments and she struggled to read grade level material successfully. Her oral reading contained many errors, repetitions and she experienced difficulty with phrasing. By the end of the study she gained 25 wpm and 3% in word accuracy. She also was reading independently at home, which is something she would not do before to the study.

Student "D"

This student was classified as Learning Disabled who experienced perceptual motor difficulties and fatigued easily. His reading rate was very slow and he had difficulty staying focused during the sessions. He enjoyed working daily with his tutors and seeing his daily progress on his graphs. He also started discussions about the books he read when he came in the following day. At the end of the study his reading grew by 33 words per minute and his accuracy rate increased by 3%.

Subject "E"

This student enthusiastically participated in her daily tutoring sessions. She worked very hard to imitate her tutor because she experienced the most difficulty with phrasing. Her greatest improvements were in the growth of expression and inflection in her voice tone. Her reading rate increased by 18 words per minute and her accuracy rate by 4%.

Summary

All five low achieving readers who participated in the study showed improvements in their reading fluency after 8 weeks of tutoring using the modified NIM. The average increase in word accuracy was 4%. All of the students increased their reading rates from 22%-48%. Three out of five subjects were able to recognize prosodic cues at the completion of the program. Parent tutors reported that the daily procedures were easy to maintain and their interactions with students were successful. There was positive feedback from parents and reading support staff. They commented on the students increased confidence and motivation to read. Students and parents expressed a desire to continue with the modified NIM, even though the study ended.

Chapter V

Conclusion and Implications

Purpose

The purpose of the study was to examine the effects of using the modified neurological impress method to improve the reading fluency of five low achieving second and third grade students.

Conclusion

The following conclusions are consistent with the previous research that supports that claim that reading fluency can be facilitated by the repeated reading and neurological impress methods. The major findings of this study indicated that the modified NIM, which is a combination of both of these methods, was effective in improving the reading fluency of five low achieving second and third grade students. At the outset each student in the study displayed oral reading that was characterized by slow, laborious and inaccurate oral reading. They also revealed negative self-concepts and poor motivation to read and write. Post intervention assessments indicated that the average gains in reading rate was 36%, or 24 words per minute, and the word accuracy was 4%. Noticeable improvements were observed in 3 students' ability to

recognize prosodic cues. After 8 hours of instruction, all five students produced oral reading that was smoother and more accurate. Parent tutors reported that they observed a reduction in anxiety and an increase in student initiated discussions about the stories they read.

This study demonstrated that the modified NIM produced positive changes in the students' reading fluency, motivation and self-concepts because it provided many supports that are highly beneficial to low achieving readers. First, this method was highly structured; constant monitoring and feedback promoted steady growth and improvement in oral reading. Second, reading in unison provided an appropriate model of the reading process, and the technique of finger sliding increases speed and reduced the possibility of developing incorrect reading patterns (word by word reading). Third, sufficient practice reading was provided with materials that were at an appropriate level of difficulty for each student. Fourth, there was daily, positive reinforcement through the encouraging words of tutors, family members, graphs that show progress, reading logs and stickers, which proved to be highly motivating. Fifth, the modified NIM is multisensory technique that compensates for a student's deficit in memory, perception and attentions. It was noted that

the LD student who participated in this study experienced the most gains in reading rate and word accuracy.

Sixth and most important, this method provided a non-threatening learning environment that nurtured an enjoyment of the reading experience.

Classroom Implications

It is important to acknowledge that reading fluency is one of many component-reading skills that is evident with competent readers. Word recognition, knowledge of syntactic structures, word meaning and sufficient background knowledge are other skills that also contribute to reading success (Mathes, Simmons, & Davis, 1992). However, research has shown that fluency is a critical skill that ensures comprehension, text engagement, vocabulary and knowledge growth and motivation to read (Stanovich, 1986). Also, recent studies have revealed that there is a need to incorporate fluency instruction into the reading curriculum.

A goal for many educators involves finding effective methods that will improve the reading fluency of low achieving readers. The study indicates that the modified NIM is one technique that can accomplish this goal. Research has suggested that struggling readers do not spend sufficient time getting the practice they need to facilitate fluency

(Allington & McGill-Franzen, 1989; Mathes, Simmons, & Davis, 1992).

This study revealed that the modified NIM would be beneficial in the

classroom because it is an approach that combined two powerful

techniques for increasing reading fluency. It was effective because the

NIM utilizes fluent models and individualized support to ensure success;

and the repeated reading technique provided the repetition necessary to

increase automatic sight word knowledge that allows for transfer to new

text.

The modified NIM produced positive changes in reading fluency

in as little as 8 hours of instruction. Other important implications for the

classroom include the fact that it was an easy technique to implement.

Special training and materials were not required. The only drawback

would be if parent volunteers were unavailable. In this event, research

has shown that peer tutors were just as effective.

Implications for Future Research

Future research surrounding the use of the modified NIM method

to facilitate reading fluency might take the following direction. Much of

the research on developing fluency described the use of the NIM or

repeated reading method. Only one study, conducted by Downs and

Morin in 1990, utilized this modified approach. Future investigations could involve using this approach with various groups of regular education and learning disabled students at the middle and high school levels to examine if the gains in rate and accuracy could be replicated.

Another direction for a study might be an adaptation of the modified NIM procedures for class wide use. The focus could be on prevention of dysfluency, rather than intervention. Conducting a longitudinal study with first and second grade students who have received fluency training using these techniques against a control group would be worthy of investigation.

Dowhower (1991) suggests that fluency has been defined as the ability to read with rate, accuracy and expression or prosody. However, little research has been conducted to investigate the role that prosody plays between comprehension and enjoyment of reading. It would be interesting to investigate prosodic reading ability more closely.

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Appendix A

PRECISION READING FORM
AND CHARTS

Student _____   Teacher _____
Date(s)   Begin on _____   End on _____

TRIAL # __
Scoring by Sentences

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	

Tabulating   Efficiency   [TIME _____

_____ x 100 = _____
correct sentences   total sentences   efficiency rate

TRIAL # __
Scoring by Sentences

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	

Tabulating   Efficiency   [TIME: _____

_____ x 100 - _____
correct sentences   total sentences   efficiency rate