Title: "Eye vs. text movement; which technique leads to faster reading comprehension?"
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EYE VS. TEXT MOVEMENT;
WHICH TECHNIQUE LEADS TO FASTER READING COMPREHENSION?

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Abstract

Eye fixation is a frequent problem that faces foreign language learners and hinders the flow of their reading comprehension. Although students are usually advised to read fast/skim to overcome this problem, eye fixation persists. The present study investigates the effect of using a paper-based program as compared to a computer-based software in speed reading on enhancing EFL majors' reading comprehension. 75 students of the primary division in the faculty of Education were randomly distributed into a control group (25), experimental group A (25), and experimental group B (25). Results of the study showed that students who were trained using the paper-based program scored significantly higher and achieved faster reading comprehension than those who were trained using the speed reading software. Discussion and interpretations of results are presented.

INTRODUCTION:

Fast reading is one of the major skills required for the competent language learner, although even some native speakers find difficulty in reading fast with full comprehension. It is a matter of training that determines how our eyes move as quickly as they can / are trained, and at the same time send comprehension signals to our minds for processing the information in the printed material. Through the researcher's experience, students who major in English at faculties of education face big problems in processing the reading materials in a sufficient time. One major problem is eye fixation; whereby a student's eye is fixed on a certain vocabulary item or phrase and hindering the smooth flow of comprehension gained from the overall meaning of the passage. Since students whose major is English language are required to undertake lengthy reading texts – including novels, plays, pieces of poetry, history of language, language pedagogy and linguistic practice- they are in real need for a strategy to develop their reading speed.

In the present study, two techniques are investigated to measure their effectiveness in developing fast reading comprehension of English majors. These two techniques are: a) timed paper-based reading, and b) timed screen-based reading. The two techniques are quite different physiologically; in the former a student's eye moves on the text in circles as fast as the student can. S/he has full command on his/her speed and on rereading if time allows. While in the latter technique, a student's eye is still whereas the text itself is moving according to a predetermined speed set by the student. Although in this latter technique a student sets his personal speed limit, the text (words, phrases or whole

sentences) moves and disappears on the computer screen. The first technique has the merit of rereading if time allows, but has the demerit of still encountering eye fixation. The second technique has the merit of avoiding eye fixation –as the student is not in command of stopping the text-, but it has the demerit of not being able to reread.

In order to investigate which technique leads to faster reading comprehension, well-designed materials were selected and manipulated for the appropriateness of the students' level. Students were then assigned to three groups; a control group that would not go through any training in speed reading, an experimental group (a) that would undergo a training course for 40 hours on speed reading using a paper-based training program, and an experimental group (b) that would undergo a training course for 40 hours on speed reading using a computer-based training program.

PROBLEM OF THE STUDY:
 Students in the primary education division, English section, in faculties of education lack the skills needed for fast reading comprehension. They practice bad reading habits including; eye fixation, synchronizing their eye movement with their lip movement in reading and pinpointing the lexical items in a reading passage while reading.
In order to solve this problem two different techniques for training on speed reading are examined.

PURPOSE OF THE STUDY:
The main purpose of the study is to investigate the effectiveness of two different techniques in training on speed reading; namely paper-based fee-eye-movement technique, and computer-based still-eye-movement technique, on the achievement of students in a speed reading test.

DEFINITION OF TERMS:
Speed reading: is a collection of reading methods which attempt to increase rates of reading without greatly reducing comprehension or retention. (Abela, 2008)

Saccade: is a fast movement of the human eye. Eye saccades are quick, simultaneous movements of both eyes in the same direction (Cassin & Solomon, 1990)

blind spot. is a sightless area within the visual field of a normal eye, caused by absence of light sensitive photoreceptors where the optic nerve enters the eye. (Cassin & Rubin, 2003)

Peripheral vision. Side vision; vision elicited by stimuli falling on retinal areas distant from the macula. (Cassin & Rubin, 2003)

Eye fixation: In the present study, eye fixation refers to stopping of eye movement encountered by students' inability to comprehend a certain linguistic item (word, phrase or sentence) mostly in a foreign language. Figure (1) shows the acuity of foveal vision in reading (during one eye stop). The lower line of text simulates the acuity of vision with the relative acuity percentages
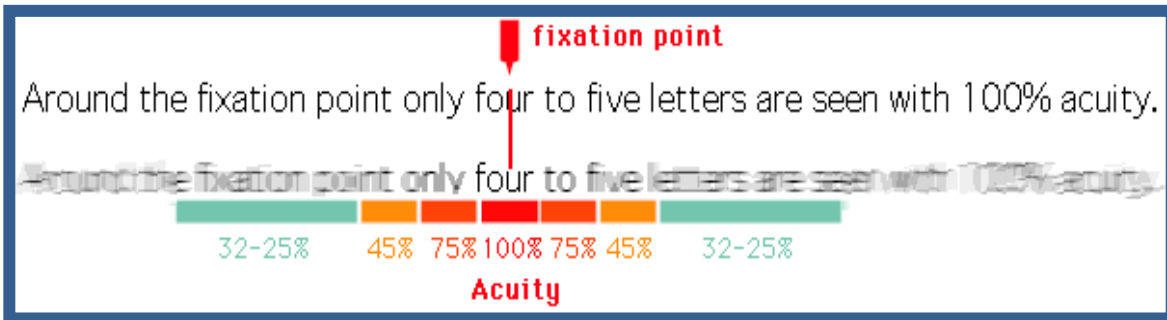
Figure (1)
Eye fixation (Hunziker, 2006)[1]

Eye span: In the present study, eye span refers to the range of words and phrases that an average human eye can capture within one saccade. Figure (2) gives an illustration of a normal reading eye span.

Figure (2)
The Reading Eye Span (Walker et al, 2005)

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[1] To do a test, close one eye, fixate the upper line at the fixation point and try to read the words to the right and left without moving your eyes. The result should be similar to the incrementally blurred lower line of text - except that you never have the impression of a blurred text. The reason: Your visual perception is already the result of a massive computational analysis made by your brain. Your system "knows" that the upper line is not blurred, so you don't see it as blurred. But the difficulty of recognition increases with the distance from the fixation point. (Hunziker: 2006)

THEORETICAL BACKGROUND:

A comprehensive understanding of the psychological processes underlying reading is vital if we are to develop better methods of teaching students to read and offer remedial treatments for those with reading disorders and problems.

Early Research

In 1879, University of Paris Professor Emile Javal observed that a reader's eyes do not sweep smoothly across print but make a series of short pauses, or saccades, at different places until reaching the end of a line, when they move to the beginning of the next in a smooth, unbroken fashion. (Goodman, 2000). Before Javal, it was assumed that the eye glided unceasingly across text—a movement that offered no real insight into the reading process. With the acknowledgment that the eye does indeed stop at certain places along a line of print came the basis for exploring the role of eye movement in reading. Numerous questions arose to become obvious points of departure for explorations into the reading process: Where does the eye stop? For how long? Why does it stop there? Why does it regress at times?

Perhaps the first concrete insight into the reading process made possible by eye-movement research was provided in 1891 by Landolt, one of Javal's colleagues at the University of Paris. Landolt observed subjects' eye movements while they read different types and genres of text, and discovered that "reading of a foreign language required more pauses, as did also the reading of detached words, numbers, and lists of proper names" (Goodman, 2000)

The Physiology of Eye Movements

Physiological studies tell us several basic facts about how the eye processes information and about the physical constraints that limit how this information is presented to the brain. During a fixation, the eye has access to three regions for viewing information: the foveal, parafoveal, and peripheral. The foveal region is the area that we think of as being in focus and includes 2 degrees of visual angle around the point of fixation, where 1 degree is equal to three or four letters (thus, six to eight letters are in focus). The parafoveal region extends to about 15 to 20 letters, and the peripheral region includes everything in the visual field beyond the parafoveal region. (Rayner & Sereno, 1994).

Reading researchers and theorists take these constraints into account when using eye-movement research to explore the perceptual process by which the brain makes something of the visual information from the eyes.

Eye Movements and Perception

It seems that when readers use their implicit knowledge of the structure of language along with their constant predictions about upcoming text, they sample from the syntactic cueing system (Goodman, 1996). This enables them to read more efficiently—to skip words that have been confirmed parafoveally.

In the early 1980s, Just and Carpenter recorded the eye-movements of 14 college students who read 15 short excerpts from Time and Newsweek magazines. The subjects were asked only to read normally and to recall what they could of each paragraph after it was finished. The researchers found that readers fixated an average of 67.8 percent of the words, with content words being fixated 83 percent of the time and function words 38 percent of the time (Carpenter & Just, 1983; Just & Carpenter, 1980). This work provided further evidence that not only is every word in a text not fixated, but the syntactic and semantic components of each word play a role in determining whether fixation occurs. In addition, data from these studies concerning the differing lengths of fixations provided evidence for two major assumptions: first, with the "immediacy" assumption, Just and Carpenter asserted that the reader tries to interpret each word in a text as it is encountered rather than holding it in abeyance and assigning meaning later; second, their "eye-mind" assumption holds that the reader's eyes remain fixated on a word as long as the word is being processed.

Readers are able to sample phonological and orthographic information in the parafoveal field of vision and use it, together with their expectations for the upcoming material to be read, either to skip text or to fixate on it for a shorter than average period. It is this sampling—as opposed to a thorough processing of each and every letter—that makes possible the efficient use of the least amount of information necessary to make sense of the text and move on. Different parts of words carry different types of semantic information, and some of these parts are more useful than others for the process of word recognition.

This conclusion indicates that readers are able to sample semantic information from the parafoveal field, which enables them to use as textual cues the most informative part of a text—a good example of one of the numerous ways readers make efficient use of text.

Assuming that the central (foveal) word is identified during a fixation, it is tempting to forward the hypothesis that eye movements in reading essentially consist of word-to-word movements. Unfortunately, such a simple sequence of motion is rarely observed in empirical data. Some words are fixated more than once, some are initially not fixated but immediately afterwards regressed to, and some are not fixated at all. Ever since the first measurements of eye movements in reading, researchers have been puzzled by

this complicated pattern of activity and have suggested various explanations for it. (Brysbaert and Vitu,1998)

The present and future of eye movement research in reading:

Most of the research of the 1980s and '90s is rooted in a view of reading as rapid, automatic, word recognition, and eye movements are studied within a set of assumptions arising from that view of the reading process.

For long, researchers have thought that, when reading, both eyes focused on the same letter of a word. But a UK team (Liversedge, Rayner, White, Vergilino-Perez, Findlay, and Kentridge, 2008) has recently found this is not always the case. In fact, almost 50% of the time, each of our eyes looks at different letters simultaneously. Sophisticated eye-tracking equipment allowed the team to pinpoint which letter a volunteer's eyes focused on, when reading 14-point font from one metre away. Rather than the eyes moving smoothly over text, they make small jerky movements, focusing on a particular word for an instant and then moving along the sentence.

"We found that in a very substantial number of fixations that people make when they read, they aren't looking at the same letter. Instead, the eyes often focused on different letters in the same word, about two characters apart. They could be uncrossed, in the sense that the two lines of sight are not crossed when you look at a word, or alternatively the two lines of sight may be crossed, or aligned". (Figure 3).

Figure (3)
Eye movement while reading (Liversedge, 2008)

Their results demonstrated that both eyes look on to the same letter 53% of the time; for 39% of the time they see different letters with uncrossed eyes; and for 8% of the time the eyes are crossing to focus on different letters. A follow-up experiment with the eye-tracking equipment showed that we only see one clear image when reading because our brain fuses the different images from our eyes together. (BBC, 2008)

REVIEW OF LITERATURE:

Rayner, Liversedge, White and Vergilino-Perez (2003) conducted a study to measure eye movement while reading disappearing text. Participants read sentences containing high- or low-frequency target words under normal reading conditions or disappearing-text conditions (in which the word that was fixated disappeared after 60 ms). Even though the fixated word had disappeared after 60 ms, there was still a robust frequency effect wherein readers fixated longer on low-frequency words than on high-frequency words. Thus, the results are consistent with cognitive-control models of eye movement control and inconsistent with visual/oculomotor-control models. Although the uptake of visual information is clearly important for reading, it is the cognitive processes associated with understanding the fixated words that drive the eyes through the text.

Liversedge, Rayner, White, Vergilino-Perez, Findlay, and Kentridge (2004) measured the gap effect in reading comprehension when reading disappearing text. Readers' eye movements were monitored when they read either normal sentences or sentences with masked or disappearing text (in which the fixated word disappeared or was masked after 60 ms). The goals of the research were to investigate (1) whether a gap effect occurred in reading and (2) the influence of linguistic and visual factors on oculomotor control. The results of a number of global analyses of eye movements under disappearing text conditions clearly demonstrated that there is no gap effect in reading. However, comparative analyses across a number of local measures in the experiments indicated that cognitive/lexical processes, as well as the continual uptake of visual information, influence eye movement control during reading. A persistent visual object throughout fixation caused refixations and even when a fixated word had disappeared (or been masked), there were significant effects of word frequency and word length.

Walker, Schloss, Fletcher, Vogel and Walker (2005) introduced a new method to enhance online reading namely visual syntactic text formatting(VSTF). This method transforms block-shaped text into cascading patterns that help readers identify grammatical structure. The method integrates converging evidence from educational, visual, and cognitive research, and is made feasible through computer-executed algorithms and electronic displays. Among college readers, the VSTF method instantly increased reading comprehension and efficiency of reading online text, while reducing eyestrain. Among high school students, who read with the format over an entire academic year, the VSTF method increased both academic achievement and long-term reading proficiency by more than a full standard deviation over randomized controls.

Rayner, Liversedge, and White (2006) studied the importance of the word to the right of fixation in eye movements when reading disappearing text. In a series of experiments, the currently fixated word (word n) and/or the word to the right of fixation (word n + 1) either disappeared or was masked during readers' eye fixations. Consistent with prior

research, when only word n disappeared or was masked, there was little disruption to reading. However, when word n + 1 either disappeared or was masked (either at the onset of fixation on word n or after 60 ms), there was considerable disruption to reading. Independent of whether word n and/or word n + 1 disappeared or was masked, there were robust frequency effects on the fixation on word n. These results not only confirm the robust influence of cognitive/linguistic processing on fixation times in reading, but also confirm the importance of preprocessing the word to the right of fixation for fluent reading.

White and Liversedge (2006) investigated the linguistic and non-linguistic influences on the eyes' landing positions during reading. Two eye tracking experiments show that, for near launch sites, the eyes land nearer to the beginning of words with orthographically irregular than with regular initial letter sequences. In addition, the characteristics of words, at least at the level of orthography, influence the direction and length of within-word saccades. Importantly, these effects hold both for lower case and for visually less distinctive upper case text. Furthermore, contrary to previous evidence, there is little effect of type case on reading times. Additional analyses of oculomotor behaviour suggest that there is an inverted optimal viewing position for single fixation durations on words. Both the supplementary analyses and the effects of orthography on fixation positions are relevant to current models of eye movements in reading.

Liversedge, White, Johnson, and Rayner (2008) marked the importance of word-beginning letters for eye movements when reading transposed text. Participants' eye movements were recorded as they read sentences with words containing transposed adjacent letters. Transpositions were either external (e.g., *problme, rpoblem*) or internal (e.g., *porblem, probelm*) and at either the beginning (e.g., *rpoblem, porblem*) or end (e.g., *problme, probelm*) of words. The results showed disruption for words with transposed letters compared to the normal baseline condition, and the greatest disruption was observed for word-initial transpositions. In Experiment 1, transpositions within low frequency words led to longer reading times than when letters were transposed within high frequency words. Experiment 2 demonstrated that the position of word-initial letters is most critical even when parafoveal preview of words to the right of fixation is unavailable. The findings have important implications for the roles of different letter positions in word recognition and the effects of parafoveal preview on word recognition processes.

Engbert, Longtin and Kliegl (2008) investigated the complexity of fixation sequences in reading based on a dynamic model of eye movement control called SWIFT. SWIFT inherently generates complicated sequences, including word skippings, refixations, and regressions. A qualitative analysis of the nonlinear deterministic control principles of a deterministic version of SWIFT was presented. For this analysis, a symbolic coding of

fixation sequences was introduced. The results showed that the experimentally observed complexity of fixation sequences is generated by nonlinear processes in addition to the stochastic influences present on several levels. The technique of fixation sequence analysis used in the study proved to be useful for the analysis of experimental data and had implications for future comparisons between different theoretical models and experimental approaches to the study of eye movement control during reading, visual search, and scene perception.

HYPOTHESIS OF THE STUDY:

1- There is no statistically significant difference between the achievement of the experimental group A in the pretest and its achievement in the posttest of speed reading.

2- There is no statistically significant difference between the achievement of the experimental group B in the pretest and its achievement in the posttest of speed reading.

3- There is no statistically significant difference between the achievement of the control group and that of the experimental group A in the posttest of speed reading.

4- There is no statistically significant difference between the achievement of the control group and that of the experimental group B in the posttest of speed reading.

5- There is no statistically significant difference between the achievement of the experimental group A and that of the experimental group B in the posttest of speed reading.

DESIGN OF THE EXPERIMENT:

- a Control group that sat for a pre and a post test in speed reading without going through the training programmes.
- An experimental group (A) that went through a 40-hour training programme in speed reading using Beatrice S. Mikulecky and Linda Jeffries' '*Reading Power 1998*'
- An experimental group (B) that went through a 40-hour training programme in speed reading using an instructional software '*AceReader pro, Version 5.0.1.7, 2008- Demo version*'
- The two experimental groups were trained by two different trainers; group (A) were trained in a normal classroom, while group (B) will be using the facilities in the digital language lab.
- The same content and number of passages were used with both groups.
- Both groups had an orientation session on the nature of speed reading and bad habits that hinder fast comprehension, and the nature of the materials to be used.

- Instructional materials for both groups were used inside the classroom and the lab only. Students weren't allowed to have access to them outside the training sessions. They were given complementary copies of the materials once the experiment was over.
- While group A was trained to move their eyes as fast as they can on the words and phrases and at the same time maintain a reasonable level of comprehension, group B was trained to let the text move as fast as they can perceive and at the same time maintain a reasonable level of comprehension. Students in both groups were be forced to adhere to any set pace; they had the free will to control their speed naturally for group A and through the program tools for group B.
- All groups (control, experimental A and experimental B) sat for a pre and a posttest in speed reading; where they were asked to read a passage of 800 words of intermediate level of difficulty in no longer than 4 minutes (200 words per minute), they were given 10 minutes to answer the questions. Although some individual students finished reading and comprehension in less than 4 minutes, in this study the concern is about the average level of comprehension in each group.

INSTRUCTIONAL MATERIALS:
- The control group did not go through the experiment; instead they studied a normal course in reading and listening as prescribed in their course specifications which do not include training on speed reading.
- Experimental group (A) was trained using Beatrice S. Mikulecky and Linda Jeffries' course '*Reading Power 2005'*. It is a course in developing reading skills (comprehension, reading for pleasure, thinking skills, and fast reading skills). It is the second of a series of books on reading skills, the first is '*Basic reading power*, and the third is *More reading power*'. Permission was granted from the publisher to used part of the book for scientific and academic purposes (see appendix C).
- Experimental group (B) was trained using *AceReader Professional*. It is a speed reading software, it works on reducing eye-fixation time and expanding the eye-fixation zone. The shareware version of the software was used since it is for all users and hence has limited access to certain functions and options. The maximum speed reading rate available in the shareware version is 400 words per minute which is a reasonable speed for intermediate students. (see appendix A for screen shots of the software)

Test in speed reading:
For the purpose of measuring different groups' achievement in speed reading, a timed fast reading test was developed. Students were required to read a passage of 800 intermediate level words in maximum of 4 minutes, which means that their average reading speed is 200 words per minute. They then were required to cover or hand back the passages and start answering an 8-item MCQ test based on the information in the

passage. The three groups sat for a pre-test in speed reading following the above procedures. They sat for version (b) of the test after the administration of the experiment.

Validity of the test in speed reading:

The test (see appendix B), was submitted to a group of EFL professionals to decide on its suitability for measuring speed reading skills and on the suitability of the distracters. Members of the jury confirmed that the test is valid for testing speed reading within the time allocated (4 minutes reading + 5 minutes answering) for this sample. They made some modifications in the distracters and the test was modified accordingly.

Reliability of the test:

The test was administered on a group of third year students (n = 50) prior to the experiment to establish its reliability. Using Alpha coefficient, the reliability for the test was 0.782. Test reliability was also measured using the split half method. Guttman coefficient for the test as a whole was 0.784, Spearman coefficient was 0.782. Both methods show that the test was reliable in measuring speed reading of third year primary education English majors.

Administration of the test:

Students in the third year primary education, English section were told that they are participating in an experiment to develop their fast reading competencies. They were asked not to write their names but to have a number instead in order to remove test anxiety and avoid group cheating. They were asked to read the passage as fast as they can and at the same time try to maintain good overall comprehension of the meaning in no longer than 4 minutes. Then they were asked to cover the passage or hand it back to the instructor and start answering questions on the passage in 5 minutes. Students were given one score for each correct answer, and a zero score for each wrong choice. Total score of the test is 8 scores. The same procedure was repeated in the post test administration.

RESULTS OF THE STUDY

T-test was run to measure the difference between the mean scores of the control group and those of the two experimental groups. Table (1) shows the different mean scores of the sample of the study.

**Table (1) Mean scores & t-value of the three
groups in the pre and the post tests**

Group / Test	Control group		Experimental 1		Experimental 2	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Pretest	4.72	1.137	5.88	1.453	5.84	1.405
Posttest	5.36**	.995	7.00**	.913	6.00*	1.080
T-sig	* non significant, ** significant at 0.001 level					

Based on the data presented in table (1), results showed the following:

1- There is a statistically significant mean difference between the mean scores of the students of the experimental group A in the pretest and their scores in the posttest of speed reading favoring that of the posttest. Pretest mean of scores was 5.88 out of a total of 8, while posttest mean of scores was 7.00 out of a total of 8. The difference is significant at 0.001. This shows that students who underwent the intensive training on paper-based speed reading scored higher in a test in speed reading after sufficient training on moving their eyes fast on reading passages.

2- There is a difference between the mean scores of the students of the experimental group B in the pretest and their scores in the posttest of speed reading. Pretest mean of scores was 5.84 out of a total of 8, while posttest mean of scores was 6.00 out of a total of 8. This difference, however, is not significant. This shows that students who underwent the intensive training on computer-based speed reading scored high, but not to a significant degree, in a test in speed reading after training on adjusting their eyes on moving reading fast texts on computer screens.

3- There is a statistically significant mean difference between the mean scores of the students of the control group in the pretest and their scores in the posttest of speed reading favoring that of the posttest. Pretest mean of scores was 4.72 out of a total of 8, while posttest mean of scores was 5.36 out of a total of 8. The difference is significant at 0.001. This shows that students who did not participate in the training on fast reading (using either eye movement training or text movement training) scored significantly higher in a test in speed reading. This will be discussed below.

4- There is a statistically significant mean difference between the mean scores of the students of the experimental group A and those of the control group in the posttest of speed reading, favoring that of the Experimental group A. Experimental group A mean of scores was 7.00 out of a total of 8, while control group mean of scores

was 5.36 out of a total of 8. The difference is significant at 0.01. This shows that students who went through the intensive training on paper-based speed reading scored higher in a test in speed reading after sufficient training on fast reading as compared to students who did not participate in the experiment.

5- There is a difference between the mean scores of the students of the experimental group B and those of the control group in the posttest of speed reading. Experimental group B mean of scores was 6.00 out of a total of 8, while control group mean of scores was 5.36 out of a total of 8. This shows that although students who went through intensive training on computer-based text movement in speed reading scored higher than those students who did not participate in the experiment, the difference is not statistically significant.

6- There is a statistically significant mean difference between the mean scores of the students of the experimental group A and those of the experimental group B in the posttest of speed reading favoring that of the experimental group B. Experimental group A mean of scores was 7.00 out of a total of 8, while experimental group B mean of scores was 6.00 out of a total of 8. The difference is significant at 0.001. This shows that students who underwent the intensive training on paper-based speed reading scored higher than those who went through training on computer-based text-movement speed-reading texts.

DISCUSSION OF RESULTS:
Based on the results attained, the following points can be stated:
- Students in the experimental group A benefited from the training program they have encountered. They were trained on reading a number of passages in as fast speed as they can. They were instructed not to look back at the passages once the allotted time is over. Students' scores in the pretest were good but their scores in an equally difficult timed test were significantly better. They seem to have benefited from this experience in overcoming the eye fixation problem that used to waste their time during reading. An average of 200 words per minute was the maximum speed allowed. It was noticed that most students didn't finish in the due time while in the posttest, which may be an indicator that some of them reached even more than the needed average of 200 words per minute.

- Students in the experimental group B seem to have encountered problems in their training experiment. They were instructed on using the software for speed reading in which the screen text, rather than their eyes, is moving at varying speeds. Although they had an introductory session for two hours on the tools of the software and a basic training on how to use them, they seem to have been puzzled with the duality of eye-text movement: they used their eye movement in the pre-

post tests while they encountered text-movement in the training. Students got good scores in the pretest, but their scores in the posttest were not good enough and were statistically insignificant. This can be attributed to the mental processing they have to undertake in addition to internalizing the comprehended meaning. Perhaps in a longer training duration, they may achieve better.

- Students in the control group got an unexpected rise in their achievement in speed reading although this rise is insignificant. The control group may have encountered what is known in research methodology as "John Henry effect" (Colman, 2001). John Henry[2] effect is a tendency for members of the control group in certain experiments to adopt a competitive attitude towards the experimental group, thereby negating their status as controls. In an industrial setting, for example, if members of the experimental group are provided with a powerful new tool, members of the control group may treat this as a challenge and, using the old tool, may try to beat the experimental group members in productivity. In the present study, the control group seems to have adopted that competitive attitude and tried to surpass the scores of students in the other two experimental groups.

- Achievement of students in experimental A was higher and more significant than that of that of the students in experimental B. This can be attributed to the extra mental effort students in experimental B had to undertake as compared to students in experimental A.

RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES:
Based on the attained results of the study, the following recommendations can be made:
1. Due attention should be paid to the training techniques in reading instruction in Egyptian universities for specialists and non specialists of English as a foreign language.
2. Implementing technology in reading instruction should go side by side with the difficulty level of the reading material, the threshold of comprehension assigned for certain groups of students, and extensive durations to best benefit from speed reading software.
3. Bad reading habits (vocalizing – pen pointing – and over eye fixation) should be highlighted in reading classes so as to let students develop strategies for overcoming them.

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[2] This effect is named after John Henry, an enormously strong and hard-working African–American railroad worker and folk tale hero of the late 19th century, possibly based on a real person.

4. A study is needed to investigate the effect of the paper-based reading materials presented in the present study with other groups of students (non specialists- ESP- general education students) and other education stages (secondary – postgraduate).
5. A study is suggested to use the computer-based software used in the present study with faster reading speeds for talented students in different education stages (intermediate - secondary – university).

EDUCATIONAL IMPLICATIONS OF THE STUDY:

From surveying the results of the study as well as the given interpretation and discussion, the study is thought to be valuable to the development of the following aspects:

1- *Reading Instructors:*

Reading instructors are advised to pay special attention speed reading as a mode of reading that is mostly neglected in our FL classes. They can benefit from the reading materials presented in the study whether paper-based or computer based for intensive training to their students at different stages. They are advised however to keep track of the different reading skills (thinking, skimming, scanning, and reading fast for pleasure) together so that students can make good use of the different skills while reading fast.

2- *Reading learners:*

The materials in the study offer challenging opportunities for students who find difficulties in reading fast especially in the department of English at faculties of Education to train themselves, after a certain time of supervised training, on fast reading skills. They, then, can apply the same techniques implemented in the present study; i.e. paper-based and computer-based on reading their instructional materials in different other courses.

3- *Reading curricula:*

The results of the present study can offer a guideline for reading course designers to the university and secondary education levels to take in consideration when developing different reading courses. Current reading courses ignore fast timed reading as major skills of reading which can overcome the problem of eye over fixation in foreign language readings.

4- *Teacher education*

It is hoped that the procedures and results of the present study be a step in the way of preparing prospective teachers of English as a foreign language in Egypt. Since teachers are required above all to be good models for teaching the four language skills (Listening, speaking, reading and writing), it is taken for granted that prospective teachers should be good language learners before being good language teachers. Being a good language learner means using the four language skills fluently, and then, being able to develop pupils' skills in these areas.

CONCLUSION

The present study investigated the difference in achievement among students who were trained using a paper-based fast reading program and students who were trained using a computer-based fast reading program as compared to a control group who did not have any training in fast reading. Results showed that both experimental groups scored higher than the control group. Paper-based students' achievement was, however, more significant than that of the computer-based students. This difference was attributed to the additional mental processing efforts students in the computer-based program had to undertake. Recommendations included conducting research on fast reading using different samples, and using different instructional materials.

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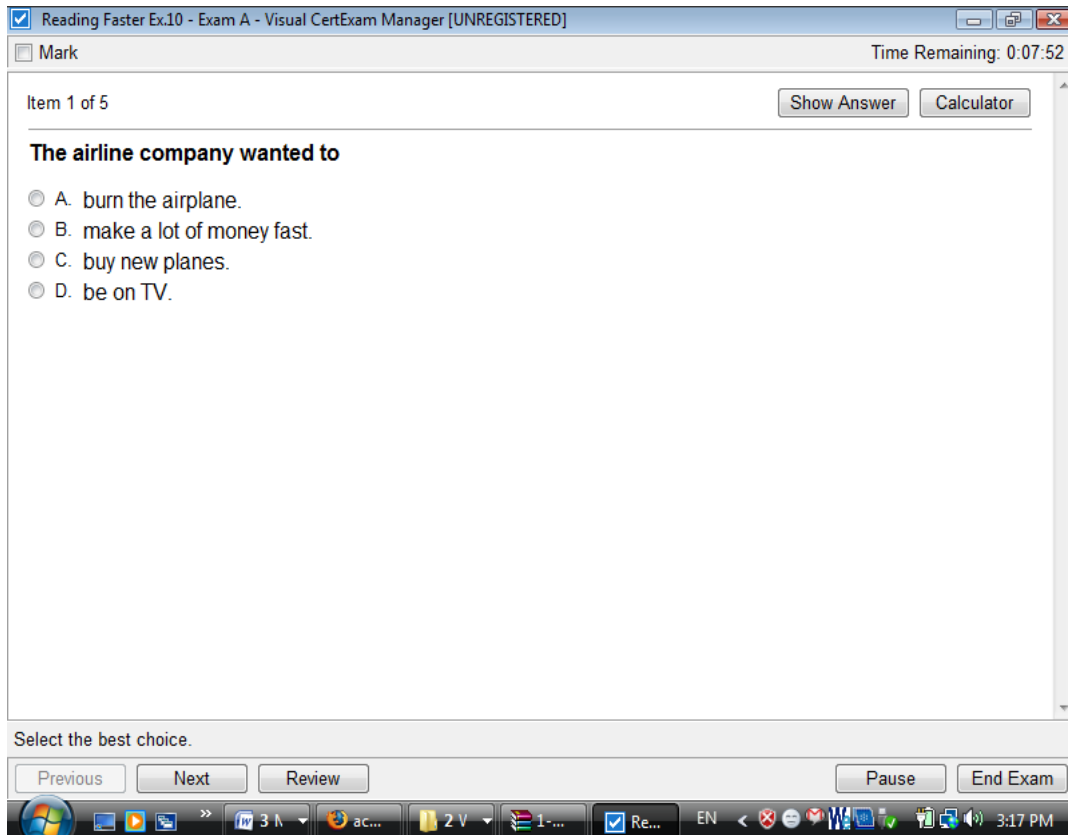
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- **Screen shots of the ace reader program**
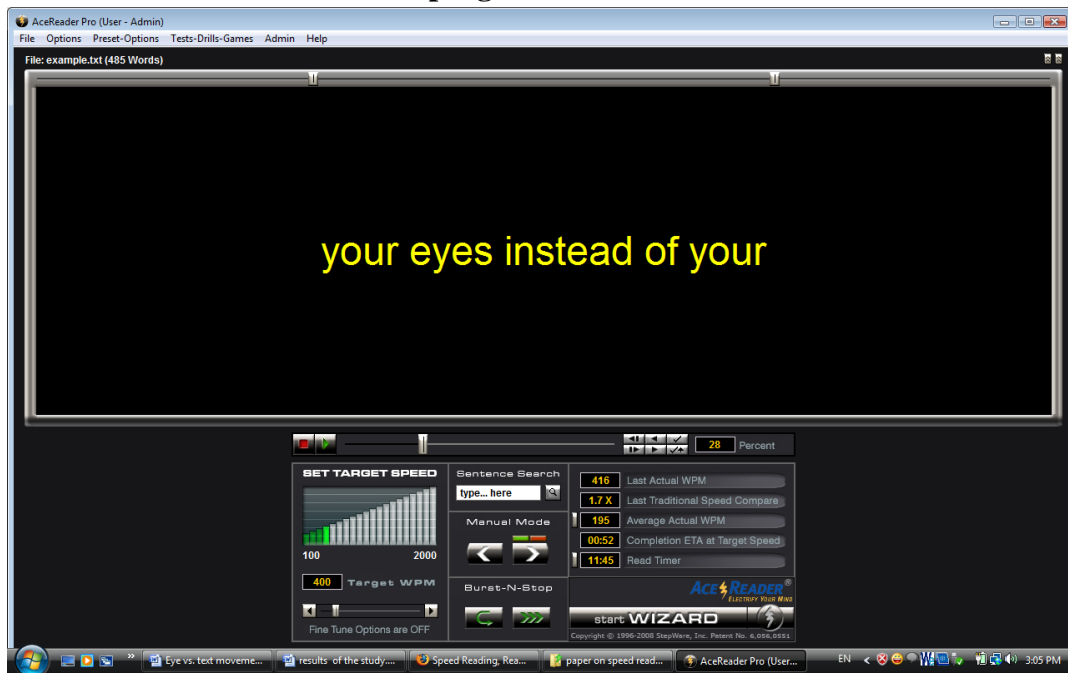
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Examination Score Report

Reading Faster Ex.10

CANDIDATE: Candidate Name
DATE: February 17, 2009   **TIME:** 3:26 PM
EXAM NUMBER: **ELAPSED TIME:** 0 hr 0 min 25 sec

Required Score
Your Score

0   500   1000

Passing Score: 1/1000   **Your score:** 400/1000   **Grade:** Pass

To view the correct answers, click the View Answers button.

Print Report   View Answers   Exit

Examination Score Report

Reading Faster Ex.8

CANDIDATE: Candidate Name
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EXAM NUMBER: **ELAPSED TIME:** 0 hr 0 min 37 sec

Required Score
Your Score

0   500   1000

Passing Score: 1/1000   **Your score:** 0/1000   **Grade:** Fail

To view the correct answers, click the View Answers button.

Print Report   View Answers   Exit

Pre-test in speed reading

Dear Student,
Read the following passage carefully but fast. You have to stop once you are instructed to do so, and start answering questions:

What Is Happening to Our Lake?

Thirty years ago, Lake Ponkapog in Hartwell, New Jersey, was full of life. Many birds and animals lived beside the water, which was full of fish. Now there are few birds, animals, and fish. The lake water is polluted. It is a dirty brown color, and it is filled with strange plants.

How did this happen? First, we must think about how water gets into Lake Ponkapog. When it rains, water comes into the lake from all around. In the past, there were woods all around Lake Ponkapog, so the rainwater was clean.

Now there are many homes on the lake shore. People often use chemicals in their gardens. They use other chemicals inside their houses for cleaning or killing insects. There are also many businesses. Businesses use chemicals in their machines or stores. Other chemicals fall onto the ground from cars or trucks. When it rains, the rainwater flows by these homes and businesses. It picks up all the chemicals and then pours them into the lake. They pollute the water and kill the animal life.

Boats on the lake are also a problem. Lake Ponkapog is a popular place for motorboats and jet-skis. But oil and gas from boats and jet-skis often get into the lake. They add more bad chemicals to the water.

There is still another problem at the lake: exotic plants. These plants come from other countries. They have no natural enemies here, and they grow very quickly, In a short time, they can fill up a lake. Then there is no room for other plants. The plants that normally grow there die. These plants gave many animals and fish their food or their homes. So now those animals and fish die, too.

People in Hartwell are worried. They love their lake and want to save it. Will it be possible? A clean lake must have clean rainwater going into it. Clean rainwater is possible only if people are more careful about chemicals at home and at work. They must also be more careful about gas and oil and other chemicals on the ground. And they must stop using motorboats and jet-skis on the lake.

All this may cause a lot of changes in people's lives. And then, scientists need to find a way to stop the exotic plants. Only then can Lake Ponkapog be a beautiful, clean lake again.

~   *Answer the questions on the following page.*

1-this article is about

                A -boats on Lake Ponkapog

                B -why the water is dirty in Lake Ponkapog

                C -the exotic plants in lake Ponkapog

                D -dirty lakes

2- Lake Ponkapog was

                A -always very polluted

                B -much larger in the past

                C -very dirty in the past

                D -not always polluted

3-the water in Lake Ponkapog comes

                A -from the land all around it

                B -from a river

                C -up from under ground

                D -from the sea

4-chemicales from homes and businesses

                A -are always cleaned up

                B -can help the animals

                C -are good for the lake

                D -get into the rainwater

5-exotic plants grow quickly because they

                A -have a lot of water

                B -have no natural enemies

                C -are large

                D -pollute the water

6-other plants and animals die when

                A -exotic plants die

                B -people grow exotic plants

                C -exotic plants fill the lake

                D -motorboats pollute the lake

7-cleaner rainwater will mean

                A -a cleaner lake

                B -more pollution in the lake

                C -more boats on the lake

                D -a dirtier lake

8-to save Lake Ponkapog, people need to

                A - be more careful about chemicals

                B - use less water

                C -stop working in their gardens

                D -stop fishing

Dear Student,
 Read the following passage carefully but fast. You have to stop once you are instructed to do so, and start answering questions:

Men in Skirts

Men do not usually wear skirts, but the Scottish national costume for men is a kind of skirt. lt is called a "kilt." The Scottish like to be different. They are also proud of their country and its history, and they feel that the kilt is part of that history. That is why the men still wear kilts at traditional dances and on national holidays. They believe they are wearing the same clothes that Scottish men always used to wear.

That is what they believe. However, kilts are not really so old. In the early days, Scottish men wore a kind of long shirt that went below their knees. They wore long socks and a big wool blanket around their shoulders. These clothes were warm and comfortable for working outside on a farm, but they were not so good when men started to work in factories in modern times. So in 1730 a factory owner changed the blanket into a skirt: the kilt. That's how the first kilt was made, according to one historian.

In the late 1700s, Scottish soldiers in the British Army began to wear kilts. One reason for this was national feeling: The Scottish soldiers wanted to look different from the English soldiers. The British Army probably had a different reason: A Scottish soldier in a kilt was always easy to find! The Scottish soldiers fought hard and became famous. The kilt was part of that fame, and in the early 1800s men all around Scotland began to wear kilts.

These kilts had colorful stripes going up and down and across. In Scotland, this pattern is called a "tartan." Tartan cloth was used many centuries ago. In fact, Scottish literature talks about tartans in the 1200s.

At first, the tartans showed where people came from. Then they became important to Scottish families. We do not know when this happened. Some people say that the colors of the family tartans are many centuries old. Others say that they became important only in the nineteenth century.

In any case, by the early 1800s, most Scottish families had special colors for their tartans. The men always wore these colors on their kilts. For example, the Campbell family tartan was dark blue, with yellow and green stripes.

The exact history of the tartan kilt is not so important. To the Scottish people today, it is part of their tradition, and that is what matters.

~   Answer the questions on the following page.

1- This article is about
    A -Scottish men
    B -the history of Scotland
    C - The history of kilts
    D -Scottish families

2-a kilt is
    A -a kind of shirt
    B -a kind of blanket
    C -a national holiday
    D -a kind f skirt

3-the first kilt was made
    A -in pairs
    B -in the British army
    C -by a Scottish factory owner
    D – by a Scottish family

4-scottish soldier wore kilts partly because of
    A -the colors
    B -the weather
    C -national feeling
    D -the style

5-kilts are made of
    A -old cloth
    B -tartan cloth
    C -old shirts
    D -Army cloth

6-the colors of the tartans
    A -may be many centuries old
    B -are unimportant to Scottish people
    C -are not Scottish
    D -are for the Campbell family only

7-by about the early 1800s, most Scottish families
    A -wore the same color kilts
    B -had special color for their kilts
    C -wore blankets
    D -wore green, yellow and blue kilts

8-scottish people
    A -always wear tartans
    B -are proud of their traditions
    C -never wear kilts for dancing
    D -wear kilts only in factories.

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