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Investigating the effect of local and global cohesion on improving reading comprehension of students with low and high prior knowledge

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ABSTRACT

The main purpose of this study was to examine the effect of local and global cohesion on improving reading comprehension of students with low and high prior knowledge. The subjects of high prior knowledge consisted of 80 third-year high school students (61 females, 19 males), and the subjects of low prior knowledge consisted of 80 third-year high school students (70 females.10 males), who were randomly selected using multistage sampling method. Participants of high and low prior knowledge were randomly assigned into four groups consisting of low local and high global cohesion, high local and low global cohesion, and low local and global cohesion, high local and global cohesion. The research instruments were: 1) experimental text, 2) comprehension test, and 3) prior knowledge test. The subjects must read the text and after that answered the questions of reading comprehension test. The collected data were statistically analyzed. Results showed that there is interaction among local and global text cohesion with reader's prior knowledge. High local and global cohesion text significantly improved comprehension, compared to the low local and global cohesion text. It was also found that readers who knew little about the domain of the text benefit from a coherent text, whereas high-knowledge readers benefit from a minimally coherent text.

Key words: text cohesion, local cohesion, global cohesion, prior knowledge, reading comprehension.

INTRODUCTION

Teaching the right lessons is the fundamental issue in the educational system. Since that time, mostly in the form of science and knowledge are transferred in writing, The basic concepts of science are available as long as the correct procedures to be used in writing the text. Now in school in spite of the variety of ways in to create educational content, the book still remains the most effective and most common of them. The communication is established through the book with contacts that can be achieved through words. Text comprehension is a complex process that is dependent on many factors. It can be placed in two categories of factors including individual characteristics of the reader and the text. Individual characteristics such as Readers of previous knowledge, skills, and characteristics of the text such as text cohesion and structure. Comprehension is the complex interaction between individual differences and characteristics of the text [10, 14].The results of the PIRLS reading indicate more than 60 percent of Iranian students are poor and very poor in the comprehension [5]. Several factors affect students' reading Comprehension. Snow 2002 quoted the [13], four factors are effective in improving reading include the reader characteristics, text characteristics, Comprehension strategies, and social and cultural situations. In this paper, reader prior knowledge and text coherence properties were investigated. In total cohesion text can be divided into local

cohesion and global cohesion. The local cohesion is driven by local structure of the text whereas the global cohesion is driven by the text's global or hierarchical structure. In addition to the text cohesion affects comprehension , But many researchers [7] argue that when the reader reaches the deep understanding that will enable processing. Kintsch stablished construction Integration (CI) model in 1988, claims that the sentence is reading has three levels of representation [11]. The level of surface structure, text-based and situation model. The surface structure represents the words in the text and their syntactic relations. The textbase level is represented in terms of propositions. One important assumption of the model is that the fundamental unit of processing is the proposition, which consists of a predicate and argument(s). The proposition generally represents one complete idea. It represents the underlying meaning of the explicit information in the text, discourse, or scene. The situation model includes all inferences that go beyond the concepts that are explicitly mentioned in the text. In the past decades, the situation model and textbase representations have often been treated as if they are compartmentalized rather than aspects of the same representation. If this characterization of the literature is correct, it reflects a fundamental misconception. Specifically, the situation model and the textbase should be viewed as different dimensions of the episodic memory for a text, rather than entirely different and separate mental representations of the text content [10]. Although these processes and outcomes are usually achieved without effort is read, but also thought that the gaps in the text (eg, gaps cohesion) to enable the reader to make up more knowledge to engage in full inferential processes. If the reader is able to automatically links to the previous discourse has been reduced to the form of prior knowledge is activated. If the reader is confronted with gaps. The reader's prior knowledge to the extent that is necessary to make active [8]. This hypothesis CI model led to the investigation by Britton and gulgoz [3]. A coherent understanding of a text or discourse emerges to the extent that the reader activates knowledge, incorporates that knowledge into the mental representations, and establishes connections between propositions in the discourse representation. Although these processes and outcomes are usually achieved without effort on the part of the reader, it is also assumed that breaks in the discourse (i.e., cohesion gaps) induce the reader to activate more knowledge and potentially engage in effortful inferential processes. If the reader can make relatively automatic connections to the prior discourse, then less prior knowledge will be activated. If gaps are encountered, then the reader will activate prior knowledge to the extent that it is available. It is this assumption of the model that led to research by Britton and Gulgoz [3], which demonstrated that the CI model can be successfully used to guide text revisions by identifying gaps in the discourse. This aspect of the model led to predictions confirmed first by McNamara, Kintsch, Songer, and Kintsch 1996 that the effects of text cohesion and prior knowledge interact.These studies show that low-knowledge readers benefit from greater cohesion in the text because they lack the necessary prior knowledge to generate bridging inferences. When the text lacks cohesion, inferences may improve the reader's textbase-level understanding and those inferences may improve the situation model for individual sentences, but the reader is generally unable to generate the knowledge-based inferences necessary to make connections between separate ideas in the text [9]. By contrast, high-knowledge readers gain from the cohesion gaps in the text because they are induced by the gaps to access knowledge to understand the text. Thus, low-knowledge readers gain from high cohesion text, whereas high-knowledge readers gain from low cohesion text. In general, research findings underline the text with low integrity level process to enhance the reader, but it is consistency right down to all the readers? Do research on the English language is used the Persian language? In general, the answer to these questions, we decided to study interaction reader's prior knowledge and text coherence. If the relationship between prior knowledge and coherence is discovered, it can be particularly useful in proportion to the student of literature, Can be used according to the level of a student from special texts. In line with these objectives, the following hypotheses were formulated.

- The level of text coherence and levels of prior knowledge in comprehension scores, reciprocal relationship exists.
- Comprehension scores of students with low and high prior knowledge have significant differences in the text of minimally coherent at both the local level and macrolevel.

MATERIALS AND METHODS

METHODS

The study population consisted of all boys and girls in third grade high school students in the city of iran-Sabzevar.The subjects of this study consisted of 160 third-year high school students (131 female, 29 male), from one town of Iran that were selected randomly by multistage sampling method. The sample was selected as follows. Overall, there were 320 students in three secondary schools. Then test the prior knowledge of the subject was conducted among 320 students the third year of high school. At this stage, the students were divided into groups with low prior knowledge and high prior knowledge. Then the top and bottom of each group was randomly divided into four groups of 20, Each group was exposed to be a version of the coherence of text. Versions of text coherence

include : a)a maximally coherent at both the local level and macrolevel.b)a maximally coherent at the local and minimally coherent at the macrolevel.c)a minimally coherent at the local level and maximally coherent at the macrolevel.d)a minimally coherent at both the local level and macrolevel.

MATERIAL

1- Test the prior knowledge - About stem cells and their applications were selected text. The multiple choice questions were prepared. Preliminary in implementing among high school students were took the discrimination coefficient and the difficult coefficient of the questions. reliability of the test ./86 Obtained.

2- Comprehension test- Comprehension test is a test with multiple questions. The test questions were written specification table and Different levels of cognitive questions were designed. These areas include: knowledge , understanding , applying level and analysis level. Test reliability ./83 Obtained.

3- Experimental texts- Topic experimental texts were regarded as "stem cells and their applications". After the text edit has been converted into four versions include: a)a maximally coherent at both the local level and macrolevel.b)a maximally coherent at the local and minimally coherent at the macrolevel.c)a minimally coherent at the local level and maximally coherent at the macrolevel.d)a minimally coherent at both the local level and macrolevel.the following four types of text revisions were used to maximize local coherence:

1-replacing prounouns with noun phrases when the referent potentially ambiguous.
2-adding descriptive eleborations that link unfamiliar concepts with familiar ones.
3-adding sentence connectives to specify the relation between sentences or ideas.
4-replacing words to increase argument overlap.
the following two types of text revisions were used to maximize global coherence:1-adding topic headers 2- adding macropropositions serving to link each paragraph to the rest of the text and overall topic.

RESULTS

To test this hypothesis: The cohesion of text and prior knowledge on reading comprehension scores, reciprocal relationship exists, First, homogeneity of variance was evaluated. To test the interaction of the independent variables in the comprehension scores were used two way analysis of variance . The statistical parameters are shown in Table 1.

Table 1. summarizes the two-way ANOVA to compare the mean difference between posttest - pretest comprehension of students participating in the study, prior knowledge and text coherence

Sources of change	Sum of squres	Degrees of freedom	Mean square	f	probability	Effect size
Prior knowledge	294.30	1	294.30	26.45	<0.001	14%
Cohesion text	137.66	3	45.89	4.12	0.008	7%
Cohesion text* Prior knowledge	303.21	3	101.07	9.08	<0.001	15%
error	1691.25	152	11.12			

Table 1 shows the mean scores of students' comprehension of text coherence ($F=4.12, P=0.008$) prior knowledge ($F=26.45, P<0.001$) and the interaction of prior knowledge and text coherence ($F=9.08, P<0.001$) there are statistically significant differences. According to the effect size , 7% of the variance in students' comprehension with text coherence can be explained. Also, the effect size, 14% of the variance in reading comprehension of students with prior knowledge can be explained. Due to the effect size , the interaction of prior knowledge and text coherence are able to explain 15% of the variance in students' reading comprehension. To test the hypothesis that “Comprehension scores of students with low and high prior knowledge have significant differences in the text of minimally coherent at both the local level and macrolevel” Independent T-test was used.

Table 2. Compare the mean difference between posttest - pretest comprehension of students participating in the study Due to the amount of prior knowledge and coherence text using independent t

Cohesion text	Prior knowledge	number	mean	Standard deviation	T	probability
Low local and global	high	20	10.65	2.96	10.21	<0.001
	low	20	3.30	1.26		
High local and low global	high	20	7.80	3.63	1.89	0.066
	low	20	5.80	3.01		
Low local and high global	high	20	8.90	4.37	1.05	0.298
	low	20	7.60	3.34		
High local and global	high	20	9.15	4.33	0.176	0.862
	low	20	8.95	2.68		

According to Table 4, only one hypothesis is confirmed. At low local and global texts, Students who have a lot of prior knowledge, Higher scores on the reading comprehension of students who have little previous knowledge gained ($T=10.21, p<0.001$). The next hypotheses are not confirmed. Between scores on the reading comprehension of students with low prior knowledge in high local and global,high local and low global,low local and high global, there is no significant difference

DISCUSSION

The results indicate that there are relationship between students' prior knowledge and text coherence. The students who have high prior knowledge benefit from text of minimally coherent at both the local level and macrolevel.and The students who have low prior knowledge benefit from text maximally coherent at both the local level and macrolevel. The results of this study support the hypothesis that Text that is needed to fill the gap of understanding is useful for learning. Of course, the learner should have sufficient knowledge about the subject, otherwise learner requires the text that should have fully coherence. Participants with high knowledge that to read text of minimally coherent at both the local level and macrolevel have Better performance on tests of reading comprehension. In this condition, participants forced to inference micro and macro cohesion. The process of active and engagement with the text improved their performance in the test. However, subjects who had a low knowledge were unable in inferences cohesion of micro and macro text . And led to reduced performance in reading comprehension tests. For subjects with low prior knowledge of the subject, as opposed to revenue results. Quite explicit text (cohesion micro- and macro above) was the most effective text in the results of comprehension test . This finding is in agreement with the prediction that participants are not able to process and understand the text. Because they lack the necessary knowledge And need the text that have These processes. This results confirme McNamara, kintsch, Songer, Kintsch 1996 and Britton and Gulgoz [3]. However, the interaction between prior knowledge and text cohesion can be explained with Kintsch [6]. Challenging texts (micro and macro cohesion bottom) provides situation model for high knowledge readers. Little knowledge readers when the text does not support (micro and macro cohesion in text below) did not constitute proper situation model. High knowledge readers actually created better situation model When they were forced to actively process the text. In the area of reading, several studies have shown the benefits of text-processing activities [6], Even texts that some letters were removed Or complex sentences written and Became clear that improves comprehension under specific conditions such Einstein, Mc Daniel, Owen and Cote, 1990, Mc Daniel, Einstein, Dunay, Kobe, 1986, quoted in [11]. this study also found If students to be in challenging situations (low cohesion text) They will be deeper comprehension. If the text is not too difficult Because students may fail On the other hand, if the text is very simple, it is possible to be less active processing [11]. In terms of educational applications, it is recommended that Coherence level of the text to be selected so that Match students with level of knowledge students Until the reading is challenging enough to stimulate active processing. But not so difficult that it fails to understand the text. It means that We try to make different versions of the text They can match up with different levels of knowledge. In this model the cohesive level commensurate with the current level of understanding the student is offered To arouse an active process. And besides, this way we will ensure that readers are able to do so. In this way, the student is forced to make use of their knowledge of what they read And the student is given the opportunity to learn from a textbook to be effective and Each student progresses at his own level.

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