

## The Effect of Interactive Approach Vs. Cognitive Approach on Students' Reading Comprehension

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**Abstract:** This study deals with testing the effect of the contribution of interactive approach and cognitive approach on enhancing students' level of reading comprehension. Based on pre-test, two homogeneous classes from the College of Basic Education were chosen as the subjects. To verify the effectiveness of either approach on promoting students' reading comprehension one group (experimental) was taught

by interactive approach and the other group was taught (control) by cognitive approach. After ten sessions of class work, the subjects were participated in a post-test. From data analysis via a t-test calculation, it became clear that the first group outperformed the second one. Therefore, it was cogently concluded that interactive approach was more effective than cognitive approach.

**Introduction:**

It is not an exaggeration to say that reading is the most important skill among the four well-known ones through which learners acquire most of their knowledge. Reading is of a paramount importance especially in the foreign language context. Reading comprehension and understanding are traditionally connected. Although reading can be done for different objectives, it is generally believed that the main purpose of reading is comprehension of the ideas presented in the texts.

Most of the research was made on reading comprehension of the first language. However, insights were adapted to suit SL reading comprehension studies. Specific attention is given to interactive approaches of reading, which argue that reading comprehension is a combination of identification and interpretation skills.

Aspatore 2005 (Internet<sup>4</sup>) discusses the problems that students have with reading as follows: They are afraid; they are more concerned with getting the correct answer than with the more important process of how to get the answer, they depend too much on the dictionary, and they have problems making the transition from short readings to long ones. To help students overcome these problems, she suggests that teachers ask them to read and underline unknown words without looking up the meaning in the dictionary; to use contextual clues to guess the general meaning; to skip unknown words; and to focus on cognates, roots prefixes, and suffixes (Chastain, 1988: 224).

As Carrell and Eisterhold (1983: 554) state that EFL/ESL reading theory has been influenced during the past decades by Goodman (from the mid- to late 1970s) who views reading as a “guessing game” in which the “reader reconstructs, as best as he can, a message which has been

encoded by a writer.” As Grabe (1991: 377) describes Godman’s perception of reading which is seen as an ... active process of comprehending [where] students need to be taught strategies to read more efficiently (e. g., guess from context, define expectations, make inferences about the text, skim ahead to fill in the context, etc. Paran (1996: 28) opposes Godman’s view of reading as an “activity involving constant guesses that are later rejected or confirmed. This means that one does not read all the sentences in the same way, but one relies on a number of words – or ‘cues’ - to get an idea of what kind of sentence (e.g. an explanation) is likely to follow”.

Hedge (2003: 34) adds that any reading component of English language course may include a set of learning goals for the ability to read are a wide range of texts in English. This is the long-range goal most teachers seek to develop through independent readers outside EFL/ESL classroom. Building knowledge of language which will facilitate reading ability needs building schematic knowledge. The ability to adapt the reading style according to reading purpose (i.e. skimming, scanning) developing an awareness of the structure of written texts in English taking a critical stance to the contents of the texts.

This study via hypothesis testing attempts to check the role of interactive approach and cognitive approach in enhancing the level of students in reading comprehension. To find the effectiveness of either approach on promoting students’ level of reading comprehension, this study intended to find an answer to the following question:

1. Is there any significant difference between the two groups of students’ in reading comprehension?
2. To conduct an unbiased study of the problem, the following null hypothesis was proposed. As far as the promotion of reading comprehension level of students is

concerned, there is no difference between control group and experimental group.

**Definition of Reading:**

The ability to read taking general comprehension as the example requires the reader to draw information from the text and combine it with the information and expectations that the reader already has. This interaction of information is a common way to explain reading comprehension, though it does not reveal much about the specific of reading. All researchers recognize that the actual ability to comprehend texts comes about through reading, and doing a great deal of it, as the core of reading instruction (Celce-Murcia, 2001:188).

The reading goal is to read for meaning or to recreate the writer's meaning. Reading to improve pronunciation, practice grammatical forms, and study vocabulary do not constitute reading at all because, by definition, reading involves comprehension. When readers do not comprehend, they are not reading (Chastain, 1988: 217). Perceiving a written text in order to understand the contents can be done silently (silent reading). The understanding that results is called reading comprehension (Richards & Renandya, 2002: 267).

Reading can be seen as an “interactive” process between a reader and a text which leads to automaticity or (reading fluency). In this process, the reader interacts dynamically with the text as he/she tries to elicit the meaning and where various kinds of knowledge are being used: linguistic or systemic knowledge (through bottom-up processing) as well as schematic knowledge (through top-down processing). Since reading is a complex process, Grabe (1991: 379) argues that “many researchers attempt to understand and explain the fluent reading process by analyzing the process into a set of component skills” in reading; consequently

researchers proposed at least six general component skills and knowledge areas:

1. Automatic recognition skills
2. Vocabulary and structural knowledge
3. Formal discourse structure knowledge
4. Content/world background knowledge
5. Synthesis and evaluation skills/strategies
6. Metacognitive knowledge and skills monitoring

Reading comprehension is defined as the level of understanding of writing. For normal reading rates (around 200-220 words per minute) an acceptable level of comprehension is above 75%. Proficient reading depends on the ability to recognize words quickly and effortlessly. If word recognition is difficult, students use too much of their processing capacity to read individual words, which interferes with their ability to comprehend what is read (Internet<sup>1</sup>).

Reading comprehension is "the process of constructing meaning through the dynamic interaction among the reader's existing knowledge, the information suggested by the written language and the context of the reading situation" (Helene et al, 1993 as cited in Ahmed, 1998: 77).

### **The Cognitive Approach:**

The cognitive approach, also known as cognitive code-learning theory, was advocated by cognitive psychologists and applied linguists such as J.B. Carroll and K. Chastain in the 1960s. It was intended as an alternative to the audio-lingual method that emphasizes habit formation as the process of language learning. Because of its emphasis on studying a foreign language as a system of rules and

knowledge, rather than learning it as a set of skills, the cognitive approach is sometimes considered the modern version of the grammar-translation method (Flavell: 1979: 908).

It is an approach to second language teaching which was based on the belief that language learning is a process which involves active mental processes and not simply the forming of habits. It gives importance to the learner's active part in the process of using the learning language (Richards & Renandya, 2002: 287).

The cognitive approach considers the conscious study of language rules as central to the learning of a foreign language. One of its most important concepts is meaningful practice. Practice is considered meaningful when the learner understands the rules involved in practice.

The cognitive approach is essentially a theoretical proposal. It did not lead to the development of any teaching method as far as classroom procedures and activities are concerned. Here are two quotes from Carrell et al, its first proponent:

*"The theory attaches more importance to the learner's understanding of the structure of the foreign language than to the facility in using that structure, since it is believed that provided the student has a proper degree of cognitive control over the structures of the language; facility will develop automatically with the use of the language in meaningful situations."*

*"...learning a language is a process of acquiring conscious control of the*

*phonological, grammatical, and lexical patterns of the second language, largely through study and analysis of these patterns as a body of knowledge" (Carrell & et al, 1989: 656)*

Thus, conscious study of grammatical rules is not only allowed, but also considered central to language learning. The teaching of grammar is deductive in this approach. The learner is encouraged and helped to first have a clear understanding of a grammatical rule before they practise and use the rule in meaningful contexts. It represents a sharp contrast to the audio-lingual method which relays on pattern drills as a means of teaching syntax, without explicit explanation of grammatical rules.

### **Interactive approach :**

In the early seventies, Goodman's psycholinguistic model of reading (later named the top-down or concept-driven model) began to have an impact on views of second language reading. In this model the readers are active, make predictions, processes information, and reconstruct a message encoded by a writer (Internet<sup>2</sup>).

According to Goodman, (1967: 129), reading is a receptive language process and a psycholinguistic guessing game, which is an essential interaction between language and thought in reading, and the writer, encodes thought as language and the reader decodes language as thought. Based on this theory, the teaching approaches of reading were suggested by three categories: Top-down, and Bottom-up approach which is two views of teaching reading as a

dichotomy, and Interactive approach which integrates these two approaches.

Carrell and Eisterhold (1983: 557) outline the processes involved in this interactive process where both bottom-up and top-down processing occur simultaneously at all levels: The data that are needed to instantiate, or fill out, the schemata become available through bottom-up processing; top-down processing facilitates their assimilation if they are anticipated by or consistent with the reader's conceptual expectations. Bottom-up processing ensures that readers will be sensitive to information that is novel or that does not fit their ongoing hypotheses about the content or structure of the text; top-down processing helps the listeners/readers to resolve ambiguities or to select between alternative possible interpretations of the incoming data. Therefore, readers can improve reading comprehension by expanding their vocabularies and gaining greater control over complex syntactic structures. Contemporary insights believe that grammar facilitates learning and its presentations to learners should be through "contextualization of linguistic forms in situations of natural use".

Cook (1997: 83) suggests that language learners be taught to alternate between top-down and bottom-up processing to check and restructure their comprehension of the content as they read. Correct predictions would seem to require little bottom-up processing, while the need to correct previous predictions might require a more careful attention to specific linguistic elements of the reading.

For learners of English, two primary hurdles must be cleared in order to become efficient readers. First, they need to be able to master fundamental bottom-up strategies for processing separate letters, words, and phrases, as well as top-down, conceptually driven strategies for comprehension.

Second as a part of that top-down approach, second language readers must develop appropriate content and formal schemata background information and cultural experience to carry out those interpretations effectively (Brown, 2004: 185).

**1. Bottom-up approach:**

The "bottom up" approach emphasizes the ability to re-code or put into sound what is seen in a text. It focuses on the knowledge on the target language more than the information on the reading. It is data-driven approach that requires the specific knowledge of language itself from the readers (Goodman, 1967: 130).

- **Implication for teaching:** As microscope view on the reading, it helps the learners to improve semantic and syntactic knowledge about the target language (Internet<sup>3</sup>).

**Bottom-Up Applications:**

Teaching key vocabulary items and, in the area of grammar, teaching various cohesive devices.

Two areas of concern:

- Simply knowing the meanings of some set number of words does not ensure that a reader will be able, while reading, to process those words both rapidly and accurately. Teachers must help students develop identification skills (exercises for rapid recognition: word recognition and phrase identification + extensive reading over time).

- Rate building: good readers read fast; they do not, like many EFL readers, try to read word by word, which destroys their chances of comprehending very much of the text. The major bottom-up skill that readers of second language must acquire is the skill of reading fast. (paced and timed reading exercises: formal rate-building work should be limited to a few minutes per class). Major increases in

reading rate can only follow from extensive reading in the language over time (Eskey & Grabe, 1990: 231-236).

## **2. Top-down approach:**

The "top down" approach focuses on what the readers bring to the process (Internet<sup>2</sup>). The readers get information from the text and contrast it with their world knowledge, helping to make sense of what is written. It is text-driven approach that the readers interact with the text.

- **Implication for teaching:** it helps the learners to improve their reading skill how to understand the general meanings of the whole reading.

The "top down" approach emphasizes readers bringing meaning to text based on their experiential background and interpreting text based on their prior knowledge (whole language).

Top = higher order mental concepts such as the knowledge and expectations of the reader.

Bottom = the physical text on the page. The top-down model of reading focuses on what the readers brings to the process. The readers sample the text for information and contrast it with their world knowledge, helping to make sense of what is written. The focus here is on the readers as they interact with the text.

## **Bottom-up and top-down:**

The two models of reading frequently regarded in connection with each other are: bottom-up and top-down models; also referred to as text-driven and concept-driven respectively (Day and Bamford 1998: 226). They both rely on the idea that every piece of reading consists of a number

of hierarchical items which are successively processed. Barnett (1985:287) distinguishes these items:

- ◆ letters and characters
- ◆ the phonological component (letter and sound correspondences)
- ◆ individual words
- ◆ the lexicon or vocabulary (words carrying meaning)
- ◆ semantics (meaningful groups of words)
- ◆ syntax or grammar (words functioning in relation to each other)
- ◆ structure of sentences, paragraphs and the whole text.

In bottom-up reading model the reader arrives at understanding, first, by combining different text elements, that is: letters and words until a chunk of data is created (this stage is called decoding). Only then does student deploy a stage of comprehension which is transforming previous phonological or articulatory data into meaning. Bottom-up model of reading is characterized by a linear process of joining lower-level text items and gradually adding them together until a meaningful chunk of data is created. (Internet<sup>3</sup>). This kind of text processing is believed to be typical of weaker second language readers and texts beyond their comprehension skills. In such cases, readers adhere to bottom-up decoding process as they cannot immediately draw meaning from the text.

A top-down reading model is almost a complete contradiction of a bottom-up model. Goodman presents it as "an interaction between reader and written language, through which the reader attempts to reconstruct a message from the writer." He also calls the model "a psycholinguistic guessing game". The last expression is quite exact as in top-down reading the reader does not instantly concentrate on

the elements of text, but produces predictions about the meaning based on his/her knowledge of syntax and semantics (Ibid).

In many cases an efficient reader appears to use what are called ‘**Top-Down**’ and ‘**Bottom-Up**’ strategies. This means that the reader will not just try to decipher the meaning of individual lexical items but will also have clear ideas about the overall rhetorical organization of the text. The essential features of the bottom-up approach are that the reader tries to decode each individual letter encountered by matching it to the minimal units of meaning in the sound system (the phoneme) to arrive at a meaning of the text, whereas with the top-down approach, the interaction process between the reader and the text involves the reader in activating knowledge of the world, plus past experiences, expectations and intuitions, to arrive at a meaning of the text. In other words, the top-down process interacts with the bottom-up process in order to aid comprehension (Internet<sup>2</sup>).

The researcher has attempted to make clear, efficient and effective reading requires both top-down and bottom-up strategies operating interactively => Interactive model. So, top-down and bottom-up processes, functioning interactively, are necessary to an adequate understanding of second language reading and reading comprehension. (Carrell, 1988: 1-4)

This model starts with the hypotheses and predictions then attempts to verify them by working down to the printed stimuli. This view of reading was called the psycholinguistic guessing game. According to Goodman (1967: 127) readers employ 5 processes in reading:

- 1- Recognition-initiation
- 2- Prediction
- 3- Confirmation

4- Correction

5- Termination

Hence, the interactive model (Rumelhart, 1977) stresses both what is on the reading and what a reader brings to it using both top-down and bottom-up skills. For the effective comprehension of reading, two approaches are integrated and involved in a reading process together. The readers continually shifts from one focus to another, which is adopting a top-down one to predict probable meaning, and then moving to the bottom-up one to check whether that is really what the writer says.

Since it requires all knowledge system activated by the readers, which are linguistic knowledge on a meaning of words or syntax, but also the cognitive knowledge about the contents of the reading, it helps the learners to make their reading more effective to understand the main ideas and improve the language skills as well. It views reading is the interaction between reader and text. The over reliance on either mode of processing to the neglect of the other mode has been found to cause reading difficulties for EFL students (Carrell, 1983: 564). The interactive models of reading assume that skills at all levels are interactively available to process and interpret the text (Grabe 1991:402).

If a text contains too many difficult words, no strategy (top down or bottom up) can make such a text accessible to the reader. However, second language readers do of course encounter some unknown words in most texts. This is the best means of increasing their control of English vocabulary. EFL students, however, are frequently panicked by unknown words, so they stop reading to look them up in dictionaries, thereby interrupting the normal reading process.

In response to this problem, many EFL texts recommend various strategies for guessing the meaning of unknown words from context, by using semantic and syntactic clues or even morphological analysis. In order to develop good reading habits, the best strategy for dealing with an unknown word may well be to keep reading until the meaning of that word begins to make itself plain in relation to the larger context provided (Internet<sup>2</sup>).

Central to all these bottom-up concerns is the concept of automaticity. Good readers, process language in the written form of written text without thinking consciously about it, and good EFL readers must learn to do so. It is only this kind of automatic processing which allows the good reader to think instead about the larger meaning of the discourse, which allows for global reading with true comprehension.

## **Methods**

### ***-Subjects***

To investigate the effect of interactive approach and cognitive approach on promoting students' reading comprehension level, 40 EFL third year students were selected randomly from among the students of the University of Misan / College of Basic education. Based on their performance on pretest, they were divided into two homogeneous groups: 20 subjects as the experimental group and 20 subjects as the control group. They were studying their first term for the academic year (2008-2009).

### **Procedures**

After the selection of the subjects, an achievement pretest was constructed. It consisted of 10 reading comprehension items. The test was designed to report the subjects' difference in their level and for determining the

homogeneity of the groups. Both groups were under the instruction of the same teacher, for two sessions a week. To check the effectiveness of each approach, after ten sessions of working on these two approaches, a post-test was administered for both groups 10 reading comprehension items. Having the data collected, the researcher processed the data using the statistical tool. To compare the results and to measure the differences, the t-test was used to determine the differences between the groups.

**Results:**

Throughout the study two t-tests have been used. According to Hatch and Farhady (1981: 70) if the t-observed exceeds the t-critical, our hypothesis is rejected.

**Table (1): t-test for Both Groups' Performance on the Pretest**

<b>Groups</b>	<b>Mean</b>	<b>SD</b>	<b>N</b>	<b>DF</b>	<b>T- Observed</b>	<b>T- Critical</b>
<b>Experimental group</b>	54.92	23.941	20	24	0.124	1.71
<b>Control group</b>	54.08	23.930	20	24		
<b>Total</b>			40	48		

$p > 0.05$

As the above results indicate, t-observed is much smaller than t-critical at the  $p < 0.05$  level of significance. Accordingly, it can be concluded that the difference between the two groups before treatment was meaningful and both groups were nearly homogeneous (see Table 1).

Five weeks later, after experiencing different treatments, both groups were given a similar post-test. As table (2) represents, the calculated mean and the standard deviation for experimental group were 44.28 and 12.22, respectively. For the control group, the corresponding values were 69.72 and 13.75. The t-observed was 6.9.

**Table (2): t-test for Both Groups' Performance on the Post-test**

<b>Groups</b>	<b>Mean</b>	<b>SD</b>	<b>N</b>	<b>DF</b>	<b>T- Observed</b>	<b>T- Critical</b>
<b>Experimental group</b>	44.28	12.22	20	24	6.9	1.71
<b>Control group</b>	69.72	13.75	20	24		
<b>Total</b>			40	48		

p>0.05

As the t-observed (6.9) exceeded t-critical (1.71) at 0.05 level of significance with 48 degree of freedom, the null hypothesis is rejected.

The main purpose of the current study was the analysis of the difference between testing the effect of the contribution of cognitive approach and interactive approach on enhancing students' level of reading comprehension. Comparing the two mean scores by using t-test, the null hypothesis was rejected. The two groups scored differently on the posttest, and the difference was statistically significant. Accordingly, the experimental group proved to be more effective and more successful in exerting desirable effects on promoting students' reading comprehension.

Although the two groups were not significantly different at the outset of the study; they behaved differently on the final test with regard to reading comprehension. Therefore, it seems justifiable to conclude that Interactive approach have served the intended purpose.

The average of the total marks of the students who are taught according to interactive approach was much higher than those participating in cognitive approach. In other words, standard deviation and mean represent that students participating in experimental group performed better than those who participated in control group.

**Conclusion :**

The purpose of reading is meaning. The goal is communication. Written communication involves a writer who activates his knowledge of the world to create a written message, and a reader, who activates his knowledge of the world to recreate to the extent possible the writer's messages. Both the teacher and the students should remember that reading is an active process involving strategies that can be learned and that it is perhaps the best means for acquiring large amount of comprehensible input.

We must make a clear distinction between the building up of particular skills and strategies, or of relevant knowledge, and reading itself. Both top-down and bottom-up skills can, in the long run, only be developed by extensive reading over time. Classroom work can point the way but cannot substitute for the act itself: people learn to read by reading, not by doing exercises.

What is needed is:

- extensive reading

- appropriate materials (relevant to students' needs and interests)

The present study focuses on two types of approaches which can be useful and effective in boosting students' comprehension level: experimental group taught by interactive approach and control group taught by cognitive approach. It was found that interactive approach would reinforce and improve the learners' comprehension level more effectively than cognitive approach.

Interactive approach has been more focused for successful reading by the teaches, and especially for L2 learners, not only top-down but also bottom-up approach should be complementarily dealt in teaching reading. It is because the semantic and syntactic levels of understanding also considerably affect the level of understanding the whole reading.

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**Appendix A:**

**Pre Reading Comprehension Test**

**Read the following passage and then answer the questions below it. For each question, choose the best response on the basis of the content of the passage you read.**

I was reluctant to go there on that first day, and as I waited outside the director's office, my anxiety only increased. My legs felt like lead. "There" was a rehabilitation residence for mentally and physically ill people. My dad, a doctor, had insisted on my volunteering at the residence. He wanted my high school community service requirement to be filled in a productive way. I felt the same. The previous summer I had gardened and picked up trash, activities that didn't really seem to make the meaningful difference that I thought I wanted to make. Still, I was scared imagining what the realities of working at the residence would be.

The director was brief. She told me about the need to establish emotional connections with the residents, then rushed to introduce me to a group of 15, their ages ranging from 8 to 21, that I was asked to supervise. My charges welcomed me graciously. Some tried to clap but couldn't bring both hands together; some tried to say hello, but their speech was so impaired that I really only guessed at what they said. Most conspicuous among them was Young-il. He was older than I, and he was the only one who spoke clearly enough for me to understand fully. Young-il had the face of a 30 year-old, but he was barely four feet tall. He took me in charge at first and, stumbling as he walked, showed me

around and taught me the basics of the residents' routine. I was embarrassed when he told me what to do; to be frank, I felt as if I were being instructed by a child. Later, thinking back on my condescension toward that kind, intelligent man, I felt a much deeper embarrassment.

The youngest was Sung-Min. He was eight years old, only three feet tall, and his fingers were all odd shapes and sizes. A teacher told me that Sung-Min's fingers used to be fused, but he had recently had an operation. Sung-Min now had five discrete digits on each hand, but their irregular forms still made it very hard for him to grasp things. In spite of his physical struggles, Sung-Min was the brightest and most energetic person at the residence. On my second day of work, he was the first to greet me, something I was grateful for, since not all of the residents remembered my face.

Helping at lunch was my most difficult task. It required considerable patience. Some residents had trouble focusing on eating and would often start shaking their heads violently as I tried to feed them. But whatever their physical challenges and discomforts were and however unappealing the food was, none of the residents ever complained. I couldn't help contrasting the residents' behavior with mine. I was again embarrassed to think about my regular pickiness, my refusal to eat this or that or at all, my demands for particular foods; and I began to hope that the road to wisdom was paved with such small embarrassments.

After my first lunch at the residence, a teacher took over the group. Everyone in the room said goodbye in his own way, and Sung-Min, the little guy with the mismatched fingers, accompanied me to the door and hugged my knees. I walked home, my legs much lighter than they had been

that morning. My fears and worries had disappeared; in their place were the surprising beginnings of an emotional connection that I had thought was beyond me. I was looking forward to seeing the residents again; to helping them, I hoped, and having them help me.

**Choose the best answer; either (A), (B), (C) or (D):**

**1. The institution where the author worked was.....**

- (A) a hospital.
- (B) a rehabilitation residence.
- (C) a job training center.
- (D) A school.

**2. When the author was leaving the residence after the first day, Sung-Min.....**

- (A) sang a song.
- (B) hugged the author's leg.
- (C) showed him around the residence.
- (D) both (A) and (B).

**3. The residents of the rehabilitation home were.....**

- (A) mostly old men.
- (B) mostly youth.
- (C) a mixture of both.
- (D) all children.

**4. Young-il is .....**

- (A) a child.
- (B) a youth.
- (C) an old man.
- (D) none of the above.

**5. The operation on Sung-Min's hands was .....**

- (A) a complete success.
  - (B) a complete failure.
  - (C) successful to some extent.
  - (D) none of the above.
6. **Sung-Min was**.....
- (A) able to speak clearly.
  - (B) unable to speak clearly.
  - (C) the most stupid person at the residence.
  - (D) Both (A) and(C).
7. **Sung-Min hugged the author's leg** .....
- (A) because he wanted to be fed.
  - (B) to help him understand the residents' daily routine.
  - (C) to help him get out of the rehabilitation home.
  - (D) as his way of saying goodbye.
8. **Residents in this rehabilitation home are occupied only** .....
- (A) in play.
  - (B) in study.
  - (C) in play and also in study.
  - (D) none of the above.
9. **After his school requirement is satisfied, the author is expected to** .....
- (A) continue to volunteer at the residence.
  - (B) stop volunteering at the residence.
  - (C) participate in a foreign-language study program abroad.
  - (D) move to another country.
10. **As a result of his experience with the residents, the author**.....
- (A) feels indifferent towards those people.
  - (B) will stop gardening and picking trash up.
  - (C) will hate his life and may commit suicide.
  - (D) will change the way he behaves.

**Appendix B:**

**Post Reading Comprehension Test**

**Read the following passage and then answer the questions below it. For each question, choose the best response on the basis of the content of the passage you read.**

Any list of the greatest thinkers in history contains the name of the Albert Einstein. His theories of relativity led to entirely new ways of thinking about time, space, matter, energy, and gravity. Einstein's work led to many scientific advances such as the control of atomic energy and the invention of television. In 1902 Einstein became an examiner in the Swiss patent office at Bern. In 1905, at age 26, he published the first of five major research papers. The first one provided a theory explaining Brownian movement, the zig-zag motion of microscopic particles in suspension. The second paper laid the foundation for the photon, or quantum, theory of light. In it he proposed that light is composed of separate packets of energy, called quanta or photons, that have some of the properties of particles and some of the properties of waves. A third paper contained the "special theory of relativity" which showed that time and motion are relative to the observer, if the speed of light is constant and the natural laws are the same everywhere in the universe. The fourth paper was a mathematical addition to the special theory of relativity. Here Einstein presented his famous formula,  $E = mc^2$ , known as the energy mass equivalence. In 1916, Einstein published his general theory of relativity. In it he proposed that gravity is not a force, but a curve in the space-time continuum, created by the

presence of mass. Einstein spoke out frequently against nationalism, the exalting of one nation above all others. He opposed war and violence and supported Zionism, the movement to establish a Jewish homeland in Palestine. When the Nazis came to power in 1933, they denounced his ideas. He then moved to the United States. In 1939 Einstein learned that two German chemists had split the uranium atom. Einstein wrote to President Franklin D. Roosevelt warning him that this scientific knowledge could lead to Germany developing an atomic bomb. He suggested the United States begin its own atomic bomb research.

**Choose the best answer; either (A), (B), (C) or (D):**

**11. According to Einstein's special theory of relativity,.....**

- (A) all properties of matter and energy can be explained in a single mathematical formula.
- (B) light is composed of separate packets of energy.
- (C) time and motion are relative to the observer.
- (D) some solids emit electrons when struck by light.

**12. According to Einstein, light is composed of separate packets of energy called.....**

- (A) quanta.
- (B) electrons.
- (C) photoelectrons.
- (D) gamma rays.

**13. What is "Brownian movement"?**

- (A) The zig-zag motion of microscopic particles in suspension.
- (B) The emission of electrons from solids when struck by light.

- (C) The motion of photons in light.
  - (D) The basis of the theory of relativity.
- 14. In which country was Einstein born?**
- (A) Switzerland.
  - (B) United States.
  - (C) Germany.
  - (D) Israel.
- 15. Einstein was born in.....**
- (A) 1897.
  - (B) 1905.
  - (C) 1800.
  - (D) 1879.
- 16. At what age Einstein became an examiner in the Swiss patent office?**
- (A) At age 25.
  - (B) At age 23.
  - (C) At age 24.
  - (D) At age 26.
- 17. According to the passage, Einstein was expected to be..... by the Jewish people.**
- (A) hated.
  - (B) loved.
  - (C) fought.
  - (D) both (A) and (C).
- 18. From the Nazis' point of view, Einstein might be considered .....**
- (A) a patriotic citizen.
  - (B) a layman.
  - (C) a generous person.
  - (D) a traitor.
- 19. If Einstein is living among us now, he would .....**
- (A) support killing and violence in Palestine.
  - (B) support Jewish settlements in Palestine.

- (C) not support Jewish settlements in Palestine.
- (D) both (A) and (B).

**20. Einstein's work in the area of physics is expected to .....**

- (A) have more practical applications than ever before.
- (B) have no applications in the future.
- (C) continue to be the base for any scientific advance in the area of physics.
- (D) both (A) and (C).

**Appendix C:**

**Answer Key For  
The Pre-Post Reading Comprehension Test**

<b>Item No.</b>	<b>Answer</b>
<b>1</b>	<b>B</b>
<b>2</b>	<b>B</b>
<b>3</b>	<b>C</b>
<b>4</b>	<b>B</b>
<b>5</b>	<b>C</b>
<b>6</b>	<b>B</b>
<b>7</b>	<b>D</b>
<b>8</b>	<b>C</b>
<b>9</b>	<b>A</b>
<b>10</b>	<b>D</b>
<b>11</b>	<b>C</b>
<b>12</b>	<b>A</b>
<b>13</b>	<b>A</b>
<b>14</b>	<b>C</b>
<b>15</b>	<b>D</b>
<b>16</b>	<b>B</b>
<b>17</b>	<b>B</b>
<b>18</b>	<b>D</b>
<b>19</b>	<b>B</b>
<b>20</b>	<b>D</b>

## تأثير الطريقة التفاعلية في فهم القراءة لدى الطلاب

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**الخلاصة:** تتناول هذه الدراسة اختبار تأثير مساهمة النهج التفاعلية ونهج على تعزيز المستوى المعرفي لدى الطلاب من القراءة والفهم. واستنادا للتجارب السابقة ، وقد تم اختيار اثنين من الطبقات متجانسة من كلية التربية الأساسية والموضوعات. كان يدرس للتحقق من فعالية نهج إما على تعزيز فهم الطلاب قراءة مجموعة واحدة (تجريبية) من النهج التفاعلية والمجموعة الأخرى كانت تدرس (مراقبة) عن طريق نهج المعرفية. بعد عشر جلسات عمل الطبقة ، وشارك في المواضيع في اختبار ما بعد. من تحليل البيانات من خلال عملية حسابية ر تجارب ، أصبح من الواضح ان المجموعة الأولى تجاوزت في ثانية واحدة. ولذلك ، استنتج بلباقة هذا النهج التفاعلية وكان أكثر فعالية من النهج المعرفي.