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The Effect of Cognitive Acceleration Strategy on EFL Intermediate School Students' Achievement

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A B S T R A C T

Cognitive Acceleration is an intervention programme with the purpose of accelerating students' 'natural' development process through different stages of thinking ability, towards the type of abstract and logical thinking. The current study aims at finding out the effect of Cognitive Acceleration Strategy on EFL intermediate school students' achievement; and finding out whether there is any significant difference between the experimental group in the pre-test and the posttest. To achieve the aims of the study, a "quisi experimental posttest design" is adopted. The sample consists of 82 second grade male students, who have been randomly selected and divided into two equal groups, i.e., experimental and control groups. Both groups are equalized in their ages, parents' educational level, their English scores in the previous year, and their achievement in the pretest. The two groups have been taught the same instructional material for a period of eight weeks. An achievement test has been constructed, validated, its reliability obtained, its items analyzed, and then applied to the two involved groups of students at the end of the instructional period of the current study. The obtained results are as follows: There is a significant difference between the achievement of the two groups, and in favour of the experimental group; and there is a significant difference between the students' achievement in the pretest and that in the posttest, and in favour of latter. Finally, the study ends up with a number of conclusions, recommendations.

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أثر استراتيجية التسريع المعرفي في تحصيل طلاب المرحلة المتوسطة دارسي اللغة الإنجليزية لغة اجنبية

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الخلاصة:

التسريع المعرفي هو برنامج تدخلي يهدف إلى تسريع عملية التطور "الطبيعي" للطلاب من خلال مراحل

مختلفة من القدرة على التفكير، كنوع من التفكير المجرد والمنطقي. تهدف الدراسة الحالية إلى: معرفة أثر استراتيجية التسريع المعرفي في تحصيل طلاب المرحلة المتوسطة في اللغة الإنجليزية ومعرفة عن ما إذا كان هناك فرق ذو دلالة إحصائية بين تحصيل المجموعة التجريبية في الاختبار القبلي والبعدي. لتحقيق اهداف الدراسة تم اعتماد "التصميم شبه التجريبي البعدي". تكونت العينة من ٨٢ طالباً من طلاب الصف الثاني في قضاء الدبس في كركوك، تم اختيارهم عشوائياً وتقسيمهم إلى مجموعتين متساويتين، المجموعة التجريبية وتضم ٤١ طالباً والمجموعة الضابطة وتضم ٤١ طالباً. كوفئت كلتا المجموعتين في أعمارهما، والمستوى التعليمي لأولياء الأمور، ودرجاتهما في اللغة الإنجليزية في العام السابق، وإنجازهما في الاختبار القبلي. تم تدريس نفس المواد التعليمية للمجموعتين لمدة ثمانية أسابيع. اعد الباحث اختباراً تحصيلياً، وتم التحقق من صحته، والتوصل إلى ثباته، وتحليل فقراته، ومن ثم تطبيقه على مجموعتي الطلاب المشاركين في نهاية الفترة التعليمية للدراسة الحالية. النتائج التي تم الحصول عليها هي كما يلي: يوجد فرق ذو دلالة إحصائية بين تحصيل المجموعتين، ولصالح المجموعة التجريبية، توجد فروق ذات دلالة إحصائية بين تحصيل الطلاب في الاختبار القبلي وفي الاختبار البعدي ولصالح الأخير. وأخيراً انتهت الدراسة إلى عدد من الاستنتاجات والتوصيات والمقترحات لمزيد من الدراسات.

كلمات مفتاحية: التسريع المعرفي، التحصيل، طلاب اللغة الإنكليزية لغة اجنبية، الصراع المعرفي، ما وراء المعرفة.

Section One: Introduction

1.1 Statement of the Problem

English has long been recognized as a global language of importance. More recently its value and prominence has increased to a far greater degree due to globalization. Schools and universities across the world have outlaid huge resources in developing English courses and programs (Banditvilai & Cullen, 2018).

EFL learners are facing difficulties and obstacles in learning English language and this must be considered and acknowledged by specialists and educators. Although, most of the students study English language for 12 years, but they do not show the required mastery of the language. Many challenges that students face were attributed to deficiencies in: language proficiency, spoken practice, writing ability, listening comprehension and reading ability. (Alsalihi, 2020).

Education plays a vital role in developing human societies through enhancing the intellectual abilities for reasoning, analysis, and perseverance on

lifelong learning, which is highly related to cognitive development (Shayer & Adey, 2002).

One of the most important roles of Cognitive acceleration strategy is to stimulate the mental growth of children, in order for them to make sense of the world around them. During the primary and secondary school years, the most pertinent years of a person's cognitive development, these thinking skills should be developed. (McCormack, 2009).

There is an increasing attention and research concerning Cognitive acceleration strategy and many studies have been conducted recently inside and outside Iraq using this strategy in teaching geography, science, biology and many other school subjects. Students' problem is their inability to use their formal operational thinking to solve problems. The teacher can be helpful in accelerating their cognitive development to reach the formal operational thinking stage by re-establishing their ways of thinking, help them to think about their own thinking and to bridge the gap between their existing knowledge and their new experiences (Nadelman, 2004).

1.2 Aims of the Study

The current study aims at:

1- Finding out the effect of Cognitive Acceleration Strategy on EFL intermediate school students' achievement.

2- Finding out whether there is any significant difference between the experimental group in the pre-test and the posttest.

1.3 Hypotheses of the Study

To verify the aims of this study, the following Hypotheses are proposed:

1- There is no statistically significant difference between the mean scores of the experimental group which has been taught by the Cognitive Acceleration Strategy and that of the control group which has been taught by the conventional method in the post achievement test.

2- There is no statistically significant difference between the mean scores of the experimental group in the pretest and posttest achievement.

1.4 Limits of the Study

The current study is limited to:

1- Second grade students at Al- Kholod intermediate school for boys in Dibis - Kirkuk.

2- The English for Iraq textbook with activity book (unit one, two and three) The academic year 2023-2024.

1.5 Definitions of Basic Terms

1.5.1 Effect

Effect refers to a result, consequence or outcome of some action, event, agent or cause (Tetzner, 2020).

The operational definition: Effect is a change which is a result or consequence of an action or other cause.

1.5.2 Cognitive acceleration

Cognitive acceleration is a term used to describe an approach to pedagogy and a research tradition in science education that is based on two broad principles: (1) that there is a general intellectual function in children which develops with age and (2) that the development of this general intellectual function is influenced both by the environment and by maturation (Shayer & Adey 2002).

The operational definition: cognitive acceleration is a process of accelerating students' natural growth through various thinking ability stages and toward a kind of abstract and logical thinking.

1.5.3 Strategy

Alonso (2023) defined strategy as "a plan of actions that fit together to reach a clear destination. That destination is dictated by a set of decisions that sets the organization apart from its competitors, derives from the organization’s unique characteristics, and is hard to emulate".

The operational definition: strategy refers to a set of methods, plans and approaches in order to achieve the objectives in the least possible time and minimal effort.

1.5.4 Achievement

Achievement is viewed basically as the competence a person have in an area of content, this competence is the result of many intellectual and nonintellectual variables (Salvador and Carmen, 2001).

Operational definition: Achievement refers to the extent to which a learner has attained in short or long-term. Therefore, Achievement is a thing done successfully with effort, skill, or courage.

1.6 Plan of the Study

The steps below are going to be followed:

1- Selecting a sample from second grade intermediate school.

2- Divide the selected sample into two equal groups, experimental group and control group.

3- Applying a written pre-test to the two groups for the sake of equalization in pupils' achievement in English subject-matter and to equalize the groups concerning mother's education, father's education and pupils' achievement at previous schooling year 2022-2023.

4- Teaching the experimental group of students with (cognitive acceleration Strategy) and the control group with conventional method for twelve weeks.

5- Constructing an achievement posttest.

6- Both experimental and control groups will be subjected to posttest to find out the role of the independent variable on students' achievement.

7- Subjecting the two groups of students to the achievement posttest.

8- Collecting the required data and analyzing it statistically.

9- Obtaining results and stating conclusion, recommendations.

Section Two: Theoretical Background

2.1 Cognitive Acceleration Strategy

Oliver et al., (2014) states that Cognitive acceleration is a “term used to describe an approach to pedagogy and a research tradition in science education that is based on two broad principles: (1) that there is a general intellectual

function in children which develops with age and (2) that the development of this general intellectual function is influenced both by the environment and by maturation (Shayer and Adey, 2002).

By ‘cognitive acceleration’ we mean the process of accelerating students' ‘natural’ development process through different stages of thinking ability, towards the type of abstract, logical and multivariate thinking which Piaget describes as "formal operations". Formal operational thinking is characterized by the ability to hold a number of variables in mind at once—for example, to be able to weigh up two sides of an argument, to consider even-handedly the advantages and disadvantages of a particular course of action, or to be able to see both the separate and combined effects of a number of input variables (for example, sunlight, carbon dioxide, water) on an outcome (the production of glucose). Piaget had suggested that this type of thinking becomes available to children as a process of natural intellectual development around the ages of 14 or 15 years. (Adey, 1999).

This strategy revolves around aspects known as the Pillars of Cognitive acceleration: Social construction, concrete preparation, cognitive conflict, bridging and metacognition all form part of the lesson. (Robertson, 2014)

2.2 Pillars of Cognitive Acceleration

Adey and Shayer, (1994) compiled five features, which became known as 'pillars' of cognitive acceleration. The pillars are incorporated into each lesson. The success of this strategy on students' cognitive development can be attributed to the application of the pillars.

Robertson (2014) provides a clear explanation of the pillars of cognitive acceleration with examples, but he does not include social constructivism, although the majority of the writers consider it as one of the pillars.

2.2.1 Concrete Preparation

Concrete preparation is the first of the pillars. It is when teachers begin the lesson by asking children what is going to be expected of them during the lesson. This covers cognitive behaviours, for example, thinking, sharing ideas, working out a problem as well as more socialised behaviours, for example, taking turns, sharing the equipment. The timing ranges from a minute to five minutes (Robertson, 2014).

2.2.2 Cognitive Conflict

According to Cognitive Acceleration theory cognitive conflict is an essential component to every lesson. Although most children at the beginning of Year 1 are generally thinking in a pre-operational or early concrete way as described by Piaget, nevertheless, a range of challenges within each lesson is crucial to the advance of each child's cognitive development. Unless each child cognitively struggles with some aspect within each lesson, then, the lesson has failed to meet its key objective. (Robertson, 2014).

2.2.3 Social Constructivism

Social constructivism is a learning theory propounded by Vygotsky in 1968, and it is one of the pillars of cognitive acceleration strategy. In social constructivism, children's understanding is shaped not only through adaptive encounters with the physical world but through interactions between people. Social Constructivism recognizes the social aspect of learning and the use of conversation, interaction with others, and the application of knowledge as an essential aspect of learning. Vygotsky believed that life long process of development is dependent on social interaction and that social learning actually leads to cognitive development. Social constructivism is also called collaborative learning because it is based on interaction, discussion and sharing among students. (Akpan et al., 2020)

2.2.4 Metacognition

In order to make the thinking and learning more conscious the teacher uses opportunities to ask questions which aim to take the children beyond the task to consider what they are learning, how they are solving the problems, which strategies are useful and which are rejected as unhelpful or less useful. Teachers are encouraged to do this at points during the lesson as appropriate. In this way, children know exactly what is being discussed. (Robertson, 2014).

Reflecting on one's own learning and thinking process serves a number of purposes. It helps to consolidate what has been learned and, more importantly *how* it has been learned. (Shayer & Adey, 2010)

2.2.5 Bridging

At various points during the lessons the teachers or children refer to a link with either some aspect of the curriculum or something from home. These links

act like memory prompts or supports to develop a more conscious awareness of the learning. Bridging usually links the kind of thinking being developed through the lesson. Opportunities for bridging are provided by the teacher or through spontaneous comments from the children. (Robertson, 2014).

According to Prabowo & Widodo (2019) bridging is the last phase in the lesson. This is the part of the class where the teacher assists students in applying their new thinking into different-but-relevant contexts.

2.3 The Stages of Cognitive Development

Piaget proposed four major stages of cognitive development, and called them (1) sensorimotor intelligence, (2) preoperational thinking, (3) concrete operational thinking, and (4) formal operational thinking. Each stage is correlated with an age period of childhood, but only approximately. (Mcleod, 2023).

2.3.1 Sensorimotor Stage

The sensorimotor stage is the stage of infancy. It begins at birth and extends until roughly age 2. According to Piaget, the baby starts life in a state of almost total egocentrism. The term egocentrism does not refer to a selfish concern with one's own wishes. It refers, rather, to a basic inability to distinguish between what is specific to the self—one's own immediate perspective, desires, or behaviors—and what exists separate from the self. A major achievement of the sensorimotor period is the gradual construction of the distinction between the self and the outer world. The two aspects of this distinction are complementary. (Nadelman, 2004)

2.3.2 The Preoperational Stage

The preoperational stage begins at about age 2 and extends until about 6 or 7 years of age. As just noted, the defining characteristic of the transition from sensorimotor to preoperational is the onset of representational ability. The essence of representational functioning lies in the ability to use one thing as a symbol to stand for some other thing, which then becomes the symbolized. Early in the child's representational career, the symbols that he is capable of generating may still be somewhat overt. Later symbols may be completely internal, in which case their exact form is no longer determinable. Symbols may be mental images, or words, or some other forms. The important point is that a

child who can generate symbols is no longer limited, as was the sensorimotor child. (Nadelman, 2004)

2.3.3 The Concrete-Operational Stage

The stage of concrete operations begins at about 6 or 7 and extends until about 11 or 12 years of age. Piaget argues that the concrete operational period marks a significant milestone in a child's development because it symbolizes the beginning of operational thought. Piaget and Inhelder (1958) define operations as any general, reversible, systematic action, and the concrete operational period marks the first-time children are able to perform and understand these actions. According to Piaget's Theory, the concrete operational period is also when children begin to understand logical concepts about physical objects and factual relationships. During this stage, children begin to perform and understand operations, but can only understand those that are directly in front of them. This is because they cannot yet comprehend abstract concepts, such as those that are verbally stated but do not contain physical characteristics. Although children cannot yet conceptualize abstract hypotheses. (Inhelder & Piaget, 1958).

2.3.4 The Formal Operational Stage

The stage of formal operations begins at about 11 or 12 years. Once again, the age norms should be regarded as quite rough. Although formal operations are unlikely to develop before about 11, it is clear that some individuals reach this stage at later date and that some never reach it at all. Gifted children may reach it earlier.

The distinguishing characteristic of formal-operational thought is the ability to deal with the hypothetical. The younger child can do this to some extent, of course; the kind of reasoning via reversibility described above involves a hypothetical rather than a real change in the material. (Nadelman, 2004)

2.4 Factors that Influence Cognitive Development

There are factors that would interact to influence change in thinking. Piaget (1970, as cited in Woolfolk, Winne and Perry 2003), identified these factors and nominated them as; biological maturation, activity, social experiences, equilibration, heredity and discussion.

2.4.1 Maturation

According to Woolfolk, Winne and Perry (2003) Maturation is the one of the important pre-requisites for the way that we make sense of the world. This factor is dealt with biological changes and unfolds these changes that are programmed in each human being at conception. Parents and teachers have little impact on this kind of change except in the case of the provision of healthier conditions which are necessary for maturation.

2.4.2 Activity

Second factor, activity, relate physical maturation to the environment and assumes that, over time whenever physical ability gains its maturation, its acts upon environment and learn from it. This factor deals with concepts such as observation, evaluation, and hypothesis formation. Children through these concepts, in other words through their physical maturation discover their milieu. (Bormanaki & Khoshhal, 2017)

2.4.3 Social Experiences

The third factor is social experiences. Paget identified this factor by taking the social context into consideration. According to this factor we cannot neglect social context, social transmissions and the relationship between people, which all influence cognitive development. We can learn from our context and culture by social transmissions and this learning is largely depended on the individual's current stage of cognitive development. (Woolfolk et al., 2003)

2.4.4 Equilibrium

According to Piaget, development is driven by the process of equilibration. Equilibration encompasses assimilation (i.e., people transform incoming information so that it fits within their existing thinking) and accommodation (i.e., people adapt their thinking to incoming information). Piaget suggested that equilibration takes place in three phases. First children are satisfied with their mode of thought and therefore are in a state of equilibrium. Then, they become aware of the shortcomings in their existing thinking and are dissatisfied (i.e., are in a state of disequilibration and experience cognitive conflict). Last, they adopt a more sophisticated mode of thought that eliminates the shortcomings of the old one (i.e., reach a more stable equilibrium). (Sandwell, 1995)

2.4.5 Heredity

It should come as no surprise that Piaget's theoretical framework deals with the role of biological factors in the development of intelligence. These factors operate in several ways: one of them is defined as the *hereditary transmission of physical structures.* The newborn's physical structure is such that when hungry he automatically signals discomfort with a wail. Often the reflexes are adaptive: they help the organism in its interaction with the environment. Another aspect of specific heredity is physical maturation. The genetic code provides the basis for the growth of physical structures along certain paths. For example, as the child grows older, the brain grows larger, and the muscles of the legs become stronger. Such physical maturation is often associated with various psychological activities: as the brain grows, speech emerges; as the leg muscles strengthen, permitting greater mobility, the child expands his exploration of the world. (Ginsburg & Opper, 1988).

2.4.6 Discussion

Jegede (2010) says though the method is time consuming, it enhances learning by giving students room to develop their communicating skills, mental skills such as critical thinking, reflective thinking and evaluating diverse opinion. (Akpan et al., 2020).

Lipman (2003) stated that discussion skills usually precede and form the basis of thinking skills (rather than the other way round). Through engaging in group dialogue in an open spirit of enquiry, in what is known as a 'community of enquiry', children can become more effective thinkers as they practise thinking about their thinking processes (Lipman, 1991, 2003).

2.5 Teacher's Role in Cognitive Acceleration Strategy

According to Adey (1999), the creation in the classroom of a very special sort of atmosphere which is intellectually rigorous but at the same time friendly and safe—in the sense that all children should feel confident in taking cognitive risks. To create such an atmosphere, the teacher needs to have:

1. clear objectives in terms of the type of reasoning being developed in a particular thinking lesson;
2. some familiarity with the underlying theory of cognitive acceleration;

3. an intimate understanding of the range of reasoning and arguments displayed by his or her pupils, if not of the particular levels of argument employed by each individual pupil.
4. mastery of a range of techniques such as asking leading questions, suspending judgment, setting challenges appropriate to particular children, and the ability to interpret children's utterances in terms of the type of thinking they are using.

Section Three: Methodology

3.1 Experimental Design

Kaps and Lamberson (2009) define experiment as an organized, planned search to obtain new facts, obtain answers, or confirm or refute the results of past experiences.

Experimental design is "the blueprint of the procedures that enable the researcher to test hypotheses by arriving at relevant conclusions on the relationship between independent and dependent variables" (Best & Khan, 2006). In the current study, the experimental design used to fit the research requirements is a "quisi experimental posttest design".

It contains the following steps.

1. Choosing two groups of students randomly and assigning them to the experimental and control groups.
2. The two involved groups are taught the same instructional material.
3. The independent variable is applied to the experimental group (teaching English through Cognitive Acceleration Strategy).
4. Teaching the control group the same instructional material taught to the experimental group, but according to the conventional method.
5. Posttesting the two involved groups of students.
6. Analyzing the collected data statistically and obtaining the final results.

3.2 Population and Sampling

Alvi (2016) states that "a population refers to all members who meet the particular criterion specified for a research investigation". The population of the

present study includes EFL Iraqi intermediate students of second year in Al-Dibis Town in Kirkuk Governorate. The total number of second grade students' is 417 distributed over four schools in Al-Dibis town.

The sample is a small proportion of students who have been chosen for analysis and observation. It is a subgroup and a small portion of a large population (Frey et al., 2000). The sample of this study consists of (82) pupils who have been chosen from the second grade at Al-Kholod intermediate school for boys in Al-Dibis Town in Kirkuk Governorate, representing 20% of the original population, (41) students have been chosen to be the experimental group, and (41) students have been chosen to be the control group. Section (A) has been chosen to be the experimental group. Section (B) has been chosen to be the control group. As shown in table (3.1)

Table (3.1)

The Population and Sample of the Study

Sections	Groups	No. of Population	No. of Pilot Students	No. of Sample Students	Percentage of sample to population
A	Experimental	417	10	41	20%
B	Control		10	41	
A+B	Total		20	82	

3.3 Construction of the Achievement Posttest

An achievement test has been constructed by considering the contents and behavioural objectives of the instructional material. It consists of five questions with twenty-seven items and scored out of hundred.

3.4 Validity

Validity is the most important criterion that determines the test quality, to make sure that the researcher uses methods that truly measure the idea of construction. Generally, validity refers to the appropriateness of the test and its components to measure what is supposed to be measured (Henning, 1987). There are two important types of validity: face validity and content validity.

3.4.1 Face Validity

Face validity, a test is said to have face validity if it looks as if it measures what it is supposed to measure (Hughes, 2003). In order to ensure the validity of the instrument of the study, the posttest has been submitted to a jury of specialists in ELT and linguistics. The jury members are asked to check the clarity and appropriateness of the test questions and items. All the notes and modifications stated by jurors have been considered.

3.4.2 Content Validity

Content Validity is concerned with the case in which the test will measure what it is supposed to measure. It checks whether the test measures the characteristics or ability aimed to be measured or not (Hughes, 1989).

3.5 Pilot Administration of the Test

A pilot study is a preliminary study carried out with a sample from the experiment sample to familiarize the researcher with any potential obstacles that may arise throughout the application of the test (Good, 1973). The aim of the pilot study is to learn how the instrument works and to estimate how long it will take to answer all of the test questions or items. It also tries to measure the test items' discrimination power and difficulty level, as well as the clarity of the test instructions.

Therefore, the test has been conducted on twenty students of the pilot sample, on the 14th of January, 2024. Results indicate that the time needed to answer all the test items ranges between (45-60) minutes and there is no ambiguity in the instructions of the given test.

3.6 Reliability of the Achievement Test

One of the necessary characteristics of a good test is reliability. Alderson (1995) states that "reliability is the extent to which test scores are consistent". The Alpha-Cronbach formula is used to measure the reliability of the posttest. The correlation coefficient is found to be 0.77 which is considered acceptable.

3.7 Analysis of the Test Items

The test items are analyzed in order to determine two important features: difficulty level, and discrimination power, as follows.

3.7.1 Difficulty Level

The proportion of students who successfully answered each question to total responses indicates the difficulty level (Rosas, 2000). The most appropriate test item will range in item difficulty from 0.15 to 0.85 (Brown 2010). The present test items' DL was discovered to range from 0.22 to 0.75.

3.7.2 Discrimination Power

The degree to which an item may distinguish between successful test takers and unsuccessful test takers is known as item discrimination. If an item gathers the correct answers from the excellent students and the incorrect responses from the weak students, it has a strong capacity for discriminating. The test item discrimination power is found to range between 0.24 and 0.54.

3.8 Final Administration of the Posttest

After verifying the validity, reliability and pilot administration, the posttest has been applied on the 18th of January 2024 for both experimental and control groups. The test papers have been distributed to the involved testes who are required to read the instructions carefully and put their answers clearly on their test papers within the limited time of the test. After that, all the test papers have been collected and scored, as shown in appendix …. according to the designed scoring scheme.

Section Four: Analysis of Data and Discussion of Results

4.1 Results Related to the First Hypothesis

To find out if there is any significant difference between the mean scores of the experimental group which has been taught by the Cognitive Acceleration Strategy and that of the control group which has been taught by the Conventional Method in the post achievement test, the mean scores and the standard deviations of the two groups have been obtained.

Results show that the mean scores of the experimental groups are 65.15 and that of the control group is 55.58. By using the t-test formula for two independent samples, the calculated t-value is found to be 3.89, while the tabulated t-value is to be 2.00 at the degree of freedom 60 and level of

significance 0.05, as shown in table (4.1). This means that there is a significant difference between the achievement of the two groups, and in favour of the experimental group. Thus, the first hypothesis, is rejected.

Table (4.1)
The Mean Scores, Standard Deviation, and t-Value of the Two Groups in the posttest

Group	No. of Students	Mean	SD.	T - value		DF	Level of Significance
EG.	41	65.15	11.45	Calculated	Tabulated	80	0.05
CG.	41	55.58	10.74	3.89	2.00		

4.2 Results Related to the Second Hypothesis

To find out if there is any significant difference between the mean scores of the experimental group in the pretest and the posttest achievement, the mean scores and the standard deviations of the two groups have been obtained.

It is found. that the mean score of the Experimental group in the Post-test is 65.15 with a standard deviation of 11.45. While the pre-test is 45.92 with a standard deviation of 9.31. The calculated t-value is 8.343, which is found to be higher than the tabulated t-value which is 2.00, at the degree of freedom 80 and the level of significance 0.05, as shown in table (4.2). This means that there is a significant difference between the students' achievement in the pretest and that in the posttest, and in favour of latter. Thus, the second hypothesis is rejected.

Table (4.2)
The mean scores, standard deviation and T-test Value of the Experimental Group in the Pretest and Posttest

Experimental	No. of					Level of

Group	Students	Mean	SD.	T - value		DF	Significance
Posttest	41	65.15	11.45	Calculated	Tabulated	80	0.05
Pretest	41	45.92	9.31	8.343	2.00		

4.3 Discussion of the Obtained Results

It is concluded that the improvement of the students' achievement could be attributed to the role of CA strategy in:

1- Accelerating students' 'natural' development process through different stages of thinking ability, towards the type of abstract, logical and multivariate thinking.

2- Frequently posing problems to be solved.

3- encouraging students to interact with each and learning cooperatively

4- making students learn from their own mistakes.

5- Creating an atmosphere that is friendly and safe where children feel confident in taking cognitive risks.

6- Connecting between the experiences gained by learners in the class and experience of everyday life.

Section Five: Conclusions, Recommendation

5.1 Conclusions

The following points are concluded, in terms of the obtained results:

1- The students have positively responded to the Cognitive Acceleration strategy, and it is found to be effective in stimulating interest, aiding retention, and stimulating the exchange of ideas.

2- The use of CA strategy has increased the development of critical thinking, or higher-level reasoning in students by giving the students an opportunity to exercise their own minds, to engage in critical thinking, and to risk opinions in a sympathetic atmosphere

3- The students in the experimental group have shown an improvement in their ability to participate in the school curriculum and an improvement in their school achievement

4- Involving the students in group work through the Cognitive Acceleration strategy encourages them to reach the full potential of their needs, which results in better achievement.

5- The students are more interested in learning and feel more confident because they have the assistance and encouragement of the members of the group.

5.2 Recommendations

In term of the obtained results and drawn conclusions, the following recommendations are put forward:

1- Specialists in teaching EFL are advised to use the CA strategy in order to improve their students' achievement in various language skills.

2- Curriculum designers in the Ministry of Higher Education are invited to recommend using Cognitive Acceleration strategy in teaching the English language.

3- Teachers of EFL should be involved in in-service training workshops that enable them to use the CA strategy for teaching various language aspects to their students and also to improve their achievement.

4- Students are encouraged to use the Cognitive Acceleration strategy to improve their achievement and accelerate their learning process.

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