Regular Article

The Effectiveness of Using Electronic Educational Games in Developing Inferential Thinking Skills for Primary School Pupils

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Abstract

The study aimed at investigating the effectiveness of using electronic educational games in developing inferential thinking skills for primary School pupils. The participants of the study were (60) sixth year primary institute pupils from Efwa primary institute, Beni-suef. The study adopted the quasi-experimental research design. So, there were two groups: an experimental group (n= 30) and a control one (n= 30). To collect data, the researcher used multiple instruments: a diagnostic test, a pre/post test, a list of electronic educational games, Skills of inferential thinking. The researcher taught both groups: the experimental group was taught through using electronic educational games while the control group was taught through the regular method of teaching. Analysis of the results revealed that experimental group participants achieved a significantly higher level in their inferential thinking skills than those of the control group. Thus, there was a statistically significant difference between the mean scores of experimental group in pre-t and post-

test of inferential thinking in the favor of the post-test. The effect size of using electronic educational games strategy was found to be high. The study recommends using electronic educational games in developing inferential thinking Skills.

Key words: *Embodiment learning, EFL oracy skills, Classroom engagement, Kindergartners*

فاعلية استخدام الألعاب التعليمية الإلكترونية في تنمية مهارات التفكير الاستدلالي لدى تلاميذ المرحلة الابتدائية

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أستاذ المناهج وطرق التدريس اللغة الانجليزية المتفرغ كلية التربية جامعة بنى سويف	أستاذ المناهج وطرق التدريس اللغة الانجليزية وعميد كلية التربية والطفولة المبكرة جامعة المنيا

ملخص الدراسة

هدفت الدراسة إلى فاعلية استخدام الألعاب التعليمية الإلكترونية في تنمية مهارات التفكير الاستدلالي في اللغة الإنجليزية لدى تلاميذ المرحلة الابتدائية. وبلغ عدد المشاركين في الدراسة (٦٠) تلميذاً في الصف السادس الابتدائي من معهد إفوا الابتدائي ببني سويف. وتم اختيار عينة الدراسة بشكل عشوائي ، وقسمت العينة الي مجموعتين (تجريبية وعددها ثلاثون طالباً واخري ضابطة وعددها ثلاثون طالباً ايضاً). واتبعت الدراسة المنهج شبه التجريبي (القبلي/البعدي) ، وقد تم تدريس المجموعة التجريبية باستخدام الالعاب التعليمية الالكترونية ، بينما تم التدريس لطلاب المجموعة الضابطة باستخدام الطريقة التقليدية . وقد أعد الباحث أدوات الدراسة والتي اشتملت علي أدوات متعددة اشتملت: الاختبار التشخيصي ، اختبار قبلي / بعدي ، قائمة ألالعاب التعليمية الالكترونية ، مهارات المفردات، ودليل المعلم. وأظهرت النتائج أن المشاركين في المجموعة التجريبية قد حققوا مستوى أعلى في مهارات التفكير الاستدلالي فى اللغة الإنجليزية عن المجموعة الضابطة. وبالتالي ، كان هناك فرق ذو دلالة إحصائية بين متوسطات درجات المجموعة التجريبية في الاختبار القبلي والبعدي للتفكير الاستدلالي لصالح الاختبار البعدي. ووجد أن حجم الاثر باستخدام الألعاب التعليمية الإلكترونية كان مرتفعا، و اوصت الدراسة باستخدام الألعاب التعليمية الإلكترونية في تنمية مهارات التفكير الاستدالالي في اللغة الإنجليزية.

الكلمات المفتاحية: الألعاب التعليمية الإلكترونية – مهارات التفكير الاستدلالي

Introduction

Thinking occupies an important place in the academic work, as it is one of the key goals of education in different stages of the learning process. In this regard, all the world's countries have developed and adopted some procedures towards organizing and developing the curricula so that students may learn methods of thinking in a way that contributes to developing the creative minds that can face the local and global challenges in different fields of life. In addition, a large number of writings and applications in the field of education have taken great interest in thinking.

Therefore, Training pupils on inferential thinking skills has become a priority in the 21st century which is characterized by an explosion of knowledge and technology in all fields. In this environment, one faces challenges that require novel and unique solutions. Educational institutes are required to prepare pupils to face challenges creatively, which reflects positively on the individual and society. Inferential thinking is associated with producing change. Thus, pupils need to be made aware that continuous change is essential in society and they need to be taught to deal with change by using different thinking patterns. Recent trends in teaching English language on teaching learners how to think, so teachers in this subject should use methods, techniques, and educational entrances that encourage learners to ask, search, investigate, conclude, and make judgments and encourage them to generate ideas, making observations, presenting conclusions, and training them on inference, which is a tool for enriching science and developing thinking by discovering new facts among available information. (Marzano, 2010).

Inferential thinking is one of the types of thinking that educational institutions seek to develop all pupils at different stages of education, as it can contribute to helping the learner to get new information from other available information and to know useful information through The knowledge explosion and the massive information

from all sources of knowledge, so that the pupil can use this information to achieve his goals and objectives of the society. (Ibrahim, 2006, p.141)

Educators also give special attention to the intellectual side of learner, learning thinking is the main aim through the development of science skills, his process, and solving of problems through scientific way. So, the last two decades showed more attention in adoption aim of thinking in curriculum of science called word which refers to a mental activity of human. It means a mental process that produces thinking and helps to transfer information to the brain and connected it with previous information stored in the brain to produce ideas and solutions, if the process of thinking is superficial, ideas will be low. Also, if thinking is deep, the thoughts will be strong. (Atta Allah, 2002, p.167)

Acordding to *Al-Rashidan & Naieem, (2002, p.251)* inference refers to a process of thinking or a way to solve problems through known introductions; it means that inference moves from known to unknown. At the same time, inference considers form from types of learning through:

- ✓ Choosing previous experiences.
- ✓ Realization relationship between things, meanings and different definitions.
- ✓ Appropriate hypothesis between methods and objectives.
- ✓ Understanding and foresight.
- ✓ Ability to infer.

Rahimi & Katal (2012) indicated that the positive effectiveness of technology on the learning process is showed through the utilization of web-based courses as learning systems. These systems might not essentially improve the performance and each "authoring related" and "learning related" problems to be thought-about so as to stratify e-learning to reinforce learning outputs. In addition, they cited that the impact of pupils' acceptance to use technology, accessibility of technology tools and applications, the positive attitudes towards the worth of applying technology, experience of the time of usage, technology knowledge and self-efficacy are in

agreement that these factors will have an effectiveness on the thriving usage of technology between pupils and teachers.

Chen (2008) mentions that using games can be a powerful tool in learning of language. In pupil's classes, games are also an important source of motivation. Games encourage the pupils to be active in the classroom. The pupils would enjoy the games and take part in them without worry. The using of this process can achieve the usual outcomes of teaching content.

Review of Literature

Ammat Kareem (2002, p.53) and Farahat(2007, p.65) mention that Inferential thinking is one of the scientific images of thinking, it is relying on the logical methods in examining and interpreting the various phenomena involved in the problems that pupils may face it during their studies and in their future lives, Thus, inferential thinking has an effective role in the life of individuals. Also, Salah (2010, p.159) mentions that The inference is one of the productive thinking in which the learner moves from what he knows to what he does not know (known to the unknown) in order to solve the problems that face him, but when the pupil starts from the previous information and experience, then connects them and concludes with the relationships to reach results, in this case pupil makes a process of inference or inferential thinking.

Mental Processes Included in Inferential Thinking

The mental processes involved in inferential thinking of the individual include the following.

1- Extracting the obvious features of situation.

2-   Testing of expected assumptions.

3- Development of laws and rules relating to a group of elements.

4- Analysis of data and components.

5- Classification of elements and components with a common relationship.

6- Conclusion of the pattern and systems.

7- Prediction of relationships between components, elements and systems.

8- Employ relationships in new situations.

9- Getting results by knowing the components of the situation.

10- Find a solution to the problem.

11- Generate and evaluate arguments and assumptions.

12- Search for evidence.

13- Reaching conclusions.

14- Identify causal relationships. (William , 2002,p. 48)

Importance of Inferential Thinking

Inferential thinking plays an active role in the life of pupils and a great importance in all kinds of life. (Abdel-Nasser, 2003, 44-46), (Kramy,2004,p. 68-70), (Ahmed El-Nagdy et al., 2005,p. 244), (Zain ,2005,p. 507), (Mustafa,2009,p.86) (Salah , 2010,p. 165-167) The importance of inferential thinking in the educational process and that importance can be summarized in:

1. Inferential thinking is a tool for enriching science and developing thinking, by discovering new facts among available facts to the learner.

2. Inferential thinking achieves the aims of education, where the pupil can think clearly and accurately and emerge from the evidence of the correct conclusions in order to make wise decisions during his life as well as he can arrive at proper solutions to the problems.

3. Inferential thinking increases pupils' education, the inference helps the pupil to get knowledge for learning, understanding and application, it provides him in an orderly way with information for education and the benefit of what he learns when he is needed through inference.

4. Inferential thinking is important in research methods, without inferring, most of our treatment of facts is unproductive.

5. To identify of relationships, know the elements of the problem in a way that leads to their reformulation, formulation and resolution.

The Impact of Electronic Educational Games on the cognitive processes

In addition, Green & Bavallier(2003) outline that visual Attention differs from attention concept. There is a lot of available visual information which cannot be processed. Consequently, attention is the mechanism by which some of the items can be selected for additional processes. Green and Bavallier clarify that when a man is reading a chapter in a book for example, he sees other things within his visual sight such as the office, a cup of coffee or a chair, and despite the presence of these things all the time, but it is probably not already noticed during the reading process. In this case, the chapter can be considered as the focus of visual attention and all other items are ignored. Thus, it can be said that what humans care about is not necessarily what they see but what they pay attention to.

A group of British researchers studied the results of chemical nerve for playing electronic educational games. They measured the amount of dopamine produced when pupils play electronic educational games. Dopamine: is one of the chemicals in the brain called neurotransmitters that allow transmission of information to different areas of the brain. These researchers prove that the percentage of dopamine increases while playing electronic educational games, especially in the areas which control the learning and reward. They also noted that electronic educational games players have much dopamine while playing which leads to rapid learning (Green & Bavallier, b ,2003).

The study of (*ELmawla,2004*) aims to know effectiveness of measurement and induction in developing inferential thinking for sixth grade, the equal between two groups through (sixth grade, age, level of learning parents, IQ test and pre-test to inferential thinking, but used instrument refers to test to measure inferential thinking which the researcher prepared it and consists of (28)paragraphs(multiple

choice).After application instrument and processing data, the results showed the effectiveness of measurement and induction in developing inferential thinking.

Context of the Problem

The problem arose when the researcher asked many of the teachers and the educators of English about the efficiency of teaching inferential thinking skills through a questionnaire prepared by the researcher to make sure of the problem. The questionnaire showed that the teaching of inferential thinking skills in the classroom still needs a lot of development to improve pupils' learning.

The researcher has also conducted a pilot study to know more about the problem, so the researcher has prepared a pre-diagnostic test based on Inferential thinking skills, covering all what the pupils studied in the first semester of the sixth grade at an Institute. The results were bad. Where (60%) of the random sample, which included sixty-five pupils, males and females, got lesser than the degree of success. It confirms that pupils need recent strategies in developing inferential thinking skills.

Statement of the Problem

Based on the literature review, the results obtained from the previously mentioned pilot study and the researcher's observation, it is emphasised that the sixth-year primary stage students need to develop their inferential thinking skills through using educational electronic games.

Questions of the Research

What is the effectiveness of the using of electronic educational games in developing inferential thinking skills of Primary School pupils?

Purpose of the Research

The main purpose of the study was as follows:

1. Investigating effectiveness of using electronic educational games in developing inferential thinking skills.

Significance of the Research

The significance of the current study is as follows:

1. Employment of electronic educational games in developing inferential thinking skills of elementary institutes' pupils.

2. Helping and encouraging many teachers to continue to pay attention and work through games and inferential thinking.

3. Inferential thinking is a tool for analyzing an individual's thinking. The individual's awareness of the inferential process gives him a tool to analyze his own thinking and increase his ability to get the data well.

Instruments and Materials

The present study employed the following instruments:

1-Measurement Tools

1- A diagnostic test for the pilot study

2- Inferential thinking skills checklist

3- A pre/post achievement test of inferential thinking skills

2- Materials

1- Electronic educational games.

1-A Diagnostic Test

A- The Objectives of Diagnostic Test

The researcher prepared a diagnostic test at the first of the problem to

1. Recognize your strengths and areas of weakness.

2. Recognize the challenges that students face when using inferential reasoning.

Description of the Diagnostic Test

A) Inferential Thinking

The test consists of (10) questions. All questions are obligatory. The number of pages is "2". The test is timed and graded. The test is of (20) marks. The test duration is (45) minutes. Test results of pupils showed in the following table.

Table (1) the results of the pupils in diagnostic test of inferential thinking

Pupils' number	65 pupils			
Categories (Marks)	0 - 5	6 – 10	11 - 15	16 - 20
Redundancy (Pupils)	17	31	12	5
Percentage	26.15%	47.69%	18.46%	7.69%

2- Inferential thinking Skills Checklist

A- The Objectives of the Checklist

First, the objective of the checklist that was prepared by the researcher is to identify and determine the most important inferential thinking skills that should be taught. The checklist was submitted to several juries (professors, supervisors and teachers). After that the researcher determined the most important and the weakest inferential thinking skills that pupils should be taught in English language.

Second, the inferential thinking skills checklist aimed at determining the most appropriate skills for sixth year primary institute pupils. The checklist was prepared in the light of directives of the ministry of education (2022-2023), the review of the literature and related studies on inferential thinking skills. Also, the viewpoints of senior teachers, supervisors and EFL experts were considered.

B-Validity of the Checklist

The checklist was refereed by professors from different universities, supervisors and teachers to decide if the skills are suitable or unsuitable through adding, removing or correcting. They were asked to assign the most important sub skills for

in-service pupils and EFL teachers. The jury members were kindly asked to judge inferential thinking skills checklist in terms of the following criteria:

1- Stating of the items.

2- How far the items measure pupils' inferential thinking.

The Jury members were also asked to give their comments and suggestions. The Jury members agreed that the checklist was valid for use since the above-mentioned criteria were met in the checklist. The Jury members also mentioned that the checklist was good and comprehensive covering the identified standards and indicators. The jury members validated the checklist and provided some comments.

The researcher modified the checklist accordingly. Some of the comments and remarks raised by the Jury members were as follows in (Table 2).

Table (2) inferential thinking skills checklist

N	Statements	Jury's No	percentage
1-	Deduce possible results in the light of preceding introductions	6	83%
2	Conclude the general rule from the part.	6	83%
3	Predict possible results in the light of preceding ideas	6	66%

An Inferential Thinking Pre /Post -Tes

A) Aims of the Test

In pre- administration, it aimed at ensuring the equivalence of both the treatment and control groups on inferential thinking skills in their entry level. Post testing aimed at measuring sixth year primary pupils' progress on inferential thinking skills.

B) Validity of Inferential Thinking Pre/ Post- Test

To determine vocabulary test validity, it was submitted to a panel of jurors (N=6), four faculty members in TEFL and a senior supervisor of ELT. The jury members gave their opinions and remarks concerning the suitability of items to the stated

objectives of the test, the adequacy of test items and their appropriateness for the determined skills and the clarity of the test instructions.

To calculate the validity of inferential thinking pre posttest, the researcher used Pearson statistical Formula as follows:

1. Using Pearson Formula, the researcher estimated the correlation of the grade of each item with the total mark of inferential thinking sub-skills. The results are as shown in table (3):

Table (3): Construct validity of the inferential thinking test

N	Inferential thinking skills	Questions	Correlation coefficient (r)	P-value
1	Deduce possible results in the light of preceding introductions	Question1	.79	0.01
2	Conclude the general rule from the part.	Question2	.85	0.01
3	Predict possible results in the light of preceding ideas	Question3	.77	0.01

The results in table (3) showed that there was a significant correlation between the different items and their sub-skills at the 0.01 level. Also, it can be noticed that the estimates ranged between 0.77 and 0.85. This means that there was strong and important correlation between marks of different items and the total mark of their sub-skills.

The researcher made the necessary changes in the light of the jurors' comments and remarks till reaching the final version of the test.

C) **Reliability of Inferential Thinking Pre/Post-Test**

To confirm that inferential thinking test measures what it is mainly designed to measure, it was evaluated by a panel of experts in educational studies and EFL Specialists. Their recommendations and comments were carefully considered. Test questions were reformed according to their suggestions. Moreover, prior to the main study, a pilot study was conducted, with a group of 20 pupils who were excluded

from the sample, to check the reliability of the pre-post test. Cranach's alpha was calculated for all the questions. Results of the reliability coefficient inferential thinking test was estimated and shown in the following table.

Table (4): The Reliability Coefficient of inferential thinking Skills test

Study tool	pupils	Questions	Cronbach's Alpha
Inferential thinking	20	3	0.81

Results in table (4) indicate that the reliability coefficients of the total inferential thinking test and it was high as its reliability coefficient was about (0.81)

4-List of Electronic Educational Games

A) Aim of Electronic Educational Games

Electronic educational games aimed at developing inferential thinking skills for sixth primary pupils. In addition, those games offer motivation, self-learning, concentration, collaboration, and immediate feedback.

B) The Implementation of Electronic Educational Games

The researcher applied electronic educational games on experimental group pupils. First, the researcher talked to the pupils about the strategy in order to warm them for learning through computer games in school computer lab. The pupils were excited, and they were involved in the teaching/learning process.

C) The Validity of Electronic Educational Games

To test the games validity, the researcher submitted electronic educational games to a group of English Language supervisors, professors and teachers.

Delimitations

The present study will be delimited to the following: -

1. This study is delimited to sixty pupils of the sixth-grade pupils at Efwa Primary Institute.
2. The study will be delimited to two groups representing the control group and experimental group.
3. Skills of inferential thinking Skills.

Method

The researcher used the quasi-experimental approach. The quasi-experimental approach by dividing pupils into two groups. One of them represents the experimental group (electronic educational games) and the other represents the control group (regular method).

Variables

This study will include the following variables: -

1- Independent Variable (electronic educational games).

2- Dependent Variable (inferential thinking skills).

Definitions

This study involves several specific terms. The terms are defined as follows:

1- Inferential Thinking

- Inferential thinking is one of the types of thinking that educational institutions seek to develop all pupils at different stages of education, as it can contribute to helping the learner to get new information from other available information and to know useful information through The knowledge explosion and the massive information from all sources of knowledge, so that the pupil can use this information to achieve his goals and objectives of the society. (Ibrahim, 2006, p.141)

Ahmed El-Nagdy et.al(2005,p. 243) knows it as a pattern of thinking designed to solve a problem and make a decision, it is also process that involves reaching a result of information, and requires the intervention of higher mental processes such as imagination, foresight, abstraction, generalization, conclusion, discrimination, inference and criticism.

Operationally, inferential thinking is defined as; it enables a pupil to get new information that will help him to solve a problem through the available information, in this case. Pupil will have new information in his mind and enables him to imagine, therefore. The pupil will able to infer in situations that will face him and find appropriate solutions.

2-Electronic Educational Games

Electronic educational games are the most popular and interesting interactive software. As El-far mentions that the computer reminds the pupils of the software which thrill them into learning to play, there will be an entertaining game in the context of which includes a specific concept or skill (Al-far 2004, p.282).

Operationally, inferential thinking is defined as it is a type of software which employed more such as, designing screen, video clips, sound effects, animation, fixed drawings, and Audio backgrounds to interact with pupil when viewing information in the educational software.

Results and Discussion

The researcher has used the Statistical Package for Social Sciences program (SPSS 22) to compute the results of the treatment and their statistical analysis. Therefore, the following statistical techniques were used:

1. Pearson Correlation coefficient: to identify or determine the correlation relationship between the different items of tests and the total mark of each test in addition to the scale relationship or correlation to the total mark.
2. Chornbach-Alpha: to calculate the reliability of study scales via analyzing the items differentiation or discrepancy.

   In order to test the study hypotheses, the researcher used these statistical techniques:

   1. Mean and Standard Deviation.

2. Independent samples t-test: to compare between the mean score of the experimental and control groups in the pre and post application of vocabulary and inferential thinking.

3. Paired samples t-test: to compare between the mean score of the experimental group in the pre and post application of inferential thinking.

4. Eita square (η2): to investigate the effect size of the experimental treatment upon the development of inferential thinking skills before and after the treatment.

The First Hypothesis

The First hypothesis stated:" There is no statistically significant difference between the mean scores of the control group and the experimental group in the pre-test of inferential thinking."

In order to verify the validity of this hypothesis, t- tests for independent samples were used to compare the mean scores of the two groups on the pre-test. The results of the t- test proved to be statistically consistent with the first hypothesis. The following table shows results concerning the first hypothesis which addressed the differences between the mean scores of the control group and those of the experimental group on the pre administration of a pre post inferential thinking test skills, regarding the results obtained from the pre-test to ensure the equivalence and homogeneity of the two groups of participants on inferential thinking before starting the treatment, the results are revealed in table (5).

Table (5) presents descriptive statistics result of inferential thinking pre-test.

Group	N	Mean	S.D.	T-value	Sig
Control	30	17.46	5.667	.422	Not
Exp	30	16.90	4.678		

The findings show that the mean score of the experimental group was (16.90)with a standard deviation of (4 .678)and the mean score of the control group was(17.46) with a standard deviation of(5.667)This indicated that the two groups were alike in a inferential thinking pre-test before conducting the treatment with electronic educational games strategy. Consequently, the first hypothesis was accepted, and the results can be illustrated in the following figure: (1)
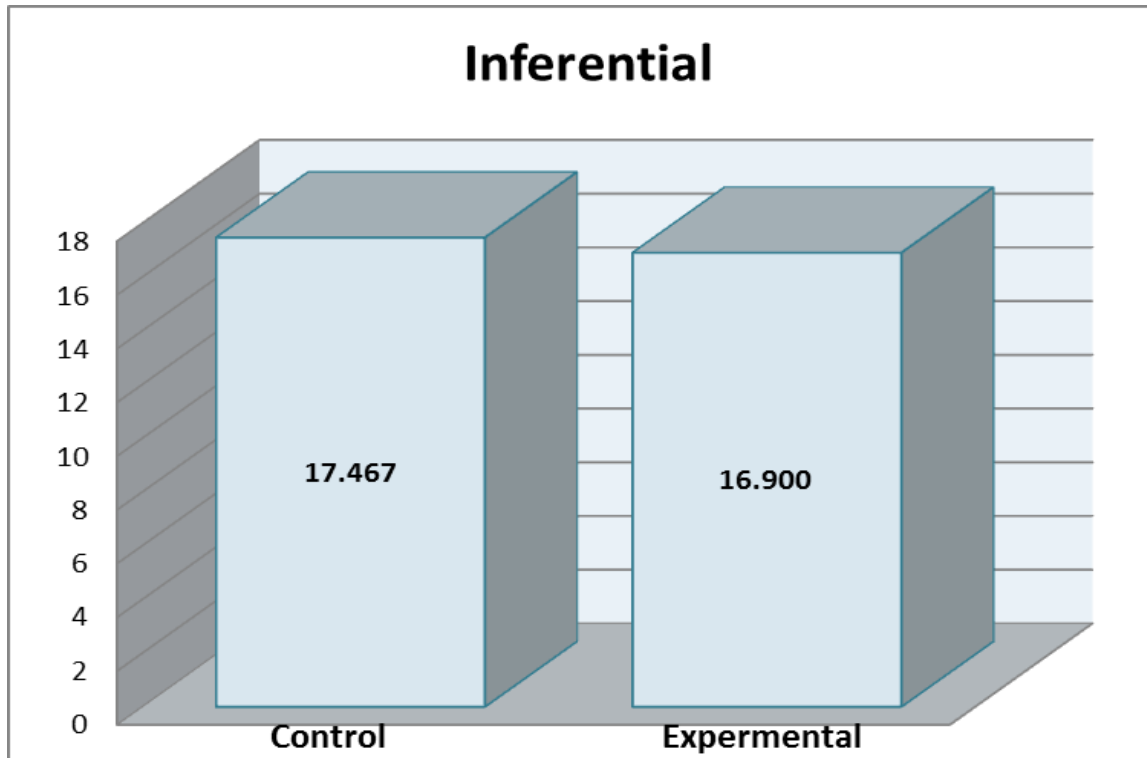

Figure (1)
The mean scores of the control and experimental groups in pre-test of inferential thinking

The Second Hypothesis

The fourth hypothesis stated, "There is a statistically significant difference between the mean scores of the control group and the experimental group in the post-test of inferential thinking skills in the favor of the experimental group".

Table (6) shows results concerning the fourth hypothesis which addressed the differences between the mean scores of the control group and those of the experimental group on the post administration of a pre post inferential thinking test

Group	N	Mean	S.D.	T-value	Sig	Effect size

Control	30	17.50	2.91	3.113	0.01	0.143
Exp	30	21	5.42			

T-test for independent samples was used to compare the mean scores of the control and experimental groups. Table (6) proved that there was a significant difference between the results of the control group and the experimental group, as the t value was (3.113), which is statistically significant at (0.01) Therefore, the second hypothesis is accepted, concluding that there is a significant difference in inferential thinking between learners taught with electronic educational games and those taught by the regular method in favor of the experimental group.

As shown in table (6), the calculated effect size value of the instructional strategy on pupils' inferential thinking was (0.143). Therefore, it can be inferred that electronic educational games strategy had a large effect on the experimental group pupils' inferential thinking skills performance on the post- test as compared to that of the control group pupils receiving conventional teaching. This improvement can be illustrated in the following figure: (2)
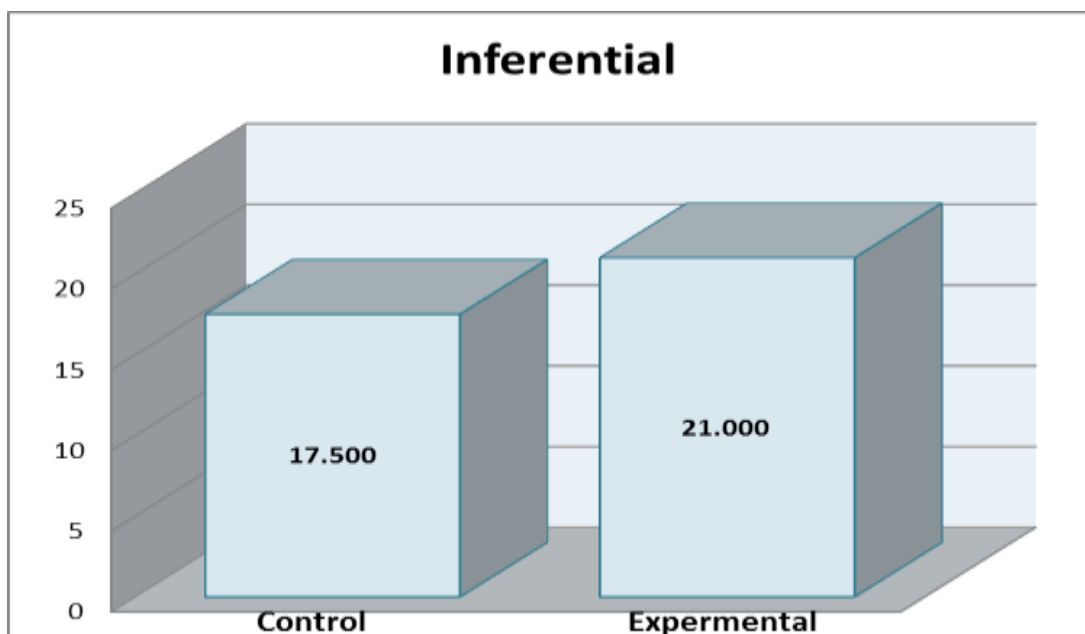
Figure (2)
The mean scores of the control and experimental groups in post-test of inferential thinking

The third Hypothesis

The sixth hypothesis stated, "There is a statistically significant difference between the mean scores of the experimental group in pre-t and post- test of inferential thinking skills in the favor of the post-test".

The following table shows results concerning the sixth hypothesis which addressed the difference between the mean scores of the experimental group on the pre- post administration in inferential thinking skills.

Table (7) presents t- test results of the pre -post -test experimental group in inferential thinking skills

Exp-group	N	Mean	S.D.	T-value	Sig	Effect size
Pre-test	30	16.90	4.67	3.378	0.01	0.282
Post-test	30	21	2.91			

Table (17) indicates that there is a statistically significant difference at (0.01) level in inferential thinking skills between the mean scores of the experimental group on the pre -test and the post-test in favor of the post-test scores since the estimated t-values was (3.378).

Thus, it can be safely said that the t-test results proved to be statistically consistent with the hypothesis. In other words, the third hypothesis was confirmed. In addition, the estimated effect size value (0.282) shown in the above table indicates that teaching by using electronic educational games strategy had a large effect on the experimental group pupils' inferential thinking and EFL performance on the post- test

as compared to their overall speaking on the pre -test. This improvement can be illustrated in the following figure (3)
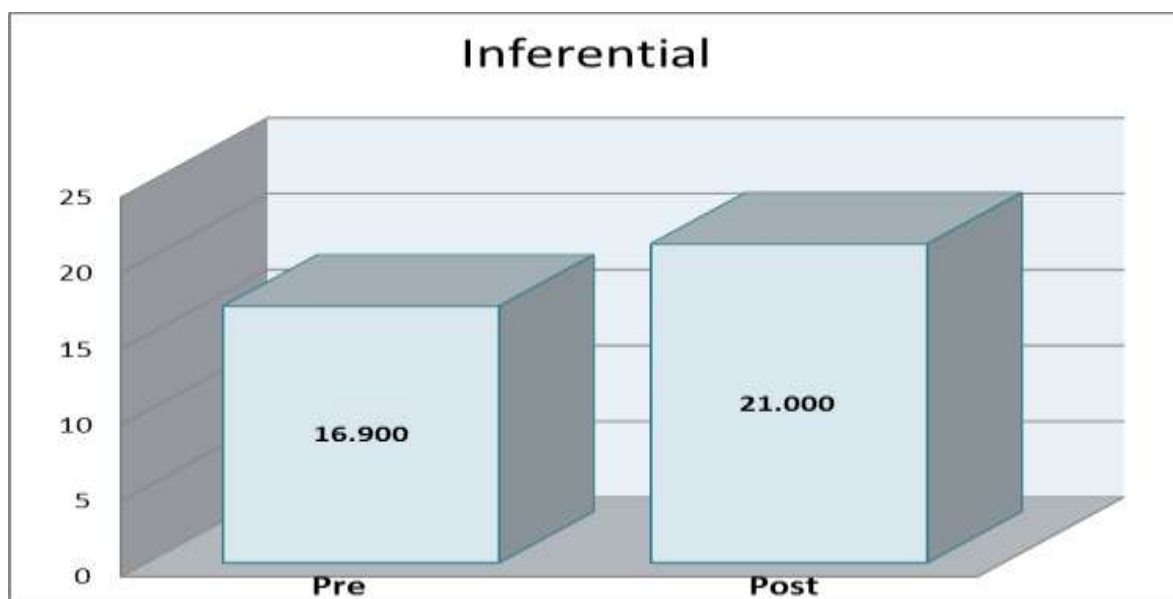

Figure (3)

The experimental group mean scores on the pre-test and post- test in inferential thinking

Discussion and Interpretation of the Findings

Based on the findings of this study, the results revealed that using electronic educational games strategy had a significant impact on developing the pupils' inferential thinking findings. The main concern of the present study was to investigate the effectiveness of electronic educational games strategy in developing primary stage pupils' inferential thinking. The previously mentioned results indicate that the mentioned strategy was highly effective. Results can be resorted to the various techniques and learning experiences provided for the target participants. The EFL pupils developed positive understandings for performing the new strategy. By the end of administering the post test, pupils changed their views of electronic educational games seeing it as part of learning and necessary to inform instructional decisions; this was obvious through pupils' answers to the inferential thinking

questions in the post test and when observing them in their actual classroom learning. Results also revealed that using electronic educational games create a positive atmosphere in which pupils are encouraged to learn effectively and positively. Consequently, some findings and their interpretation can be summarized as follows:

1. Electronic educational games also created a relaxed, fun filled and anxiety-free atmosphere that facilitated and enhanced learning.

2. The pupils learned more and were motivated by many activities. Learners developed in terms of autonomous learning because in this class learners cooperated in groups. They learned from each other, and helped each other. A classroom was motivated by the various activities. .

The research revealed that the experimental group outperformed the control group in inferential thinking skills. The experimental group means score was significantly higher than that of the control group in the most of skills. Moreover, the experimental group pupils were also better than the control group in their ability to learn inferential thinking. The experimental group pupils performed better in all of inferential thinking skills on the post-test. This proves that using electronic educational games helped the experimental group pupils to develop their skills in inferential thinking.

Conclusions

Absence of innovation and the regular methods of teaching inferential thinking skills in EFL classroom where pupils have a passive learning role provided the researcher an opportunity to investigate the effectiveness of electronic educational games on pupils' learning and find out whether it has a positive effect on pupils' motivation. Hence, the current research proved that using electronic educational games was effective in developing pupils' inferential thinking skills. Within the delimitations of the research and based on the results of the study, the following conclusions have been drawn:

1- Electronic educational games increase motivation and desire for self-improvement.

2- Electronic educational games develop critical thinking, problem solving, and imagination.

3- Electronic educational games appear to enhance the learners' confidence in learning English.

Recommendations

Based upon the results of the research and the above-mentioned conclusions, the following recommendations are suggested:

1- Learners of English Language:

1- Pupils' centered learning should be emphasized and activities (before, during and after learning) should be maximized.

2- Pupils should become the center of the learning process and should share more responsibilities. Hence, more opportunities should be given to them.

3- Pupils should be motivated to freely communicate and interact with each other to practice activities.

2- Teachers of English are recommended to:

1- Give immediate feedback after each activity to enhance pupils' learning.

2- Change traditional roles from being just as a carrier of knowledge to a facilitator, a guide, an adviser, a manager and an encourager for the educational process

3- Organize special training for the low achievers to give them the opportunities to participate and correct their mistakes.

4- Enroll in training courses for self-development to be able to use the modern active learning strategies.

5- Pay more attention to develop pupils' thinking skills especially inferential thinking.

6- Provide pupils with a relaxing, effective, and interactive environment that fosters interaction and helps to develop the pupils' thinking skills.

3- Curriculum developers:

1- More concentration should be paid to developing curricula which develops inferential thinking of pupils rather than memorizing.

2- Curriculum developers are advised to integrate the use electronic educational games in the English curriculum.

3- Curriculum developers should design educational curricula which depend on using active learning strategies in general and with electronic educational games strategy to develop inferential thinking and give pupils the opportunities to practice the language freely and correctly.

4 -English language experts, specialists, and supervisors are recommended to:

1. Set training courses should be provided for EFL teachers to give them practice on   the use of electronic educational games in the learning process.

Suggestions for further research

Based on the results of the present study, the following recommendations should be conducted:

1. Investigating the effectiveness of using electronic educational games in developing inferential thinking for preparatory stage pupils.
2. Investigating the effectiveness of using electronic educational games in developing grammar and inferential thinking for primary stage pupils.
3. Conducting a study to investigate the effect using electronic educational games on developing reading and listening and inferential thinking for primary stage pupils

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