

# Effectiveness of using Cognitive Virtual Tours based on Marzano Model to Develop the Achievement and Historical Research Skills for Secondary School Students

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## Summary

The study aimed to measure the effectiveness of using Cognitive virtual tours based on Marzano model to develop the achievement and some of historical research Skills for secondary school students. To achieve the objectives of the study, the experimental method was used and two study groups consisted of (60) students were divided into two groups, one is Control (30) students and the other is in experimental (30) students at Alsalam secondary in Ismailia Governorate. The study used several tools: The experimental processing tool of Cognitive Virtual tours based on Marzano model, Cognitive achievement test for the first unit of Secondary first grade history Course. Historical research skills. The finding of the study showed the effectiveness of using cognitive virtual tours based on Marzano model in developing the achievement and some of historical research skills for first grade secondary students which there are Statistically differences at level (0.01) between the average scores of the students in (experimental and Control) groups in post application for Cognitive achievement test. Practical application of the study can contribute to clarify how to use Cognitive virtual tours based on Marzano model in teaching history, and Draw the attention of history developers to the development of historical research skills.

## Keywords:

*Cognitive virtual tours, Marzano model, achievement historical research Skills, Secondary school students.*

## 1. Introduction

The development in interactive technology has led to the existence of new formats for interaction that are close to realism, and the use of virtual reality presentation and Computer-generated interactive experiences allows students to take a virtual tour in a virtual environment close to reality and may even be better than it, where they are allowed to circulate images close to reality and they immerse themselves in the virtual environment, and inter with it, with sound and image, seeing what Cannot seen in reality (Halat, E. & Karakus, 2014).

History science comes at the forefront of the social sciences that are concerned with studying the past of human events and this is what makes history deal with all human events and therefore it is important field of study, through which the patriotic

feeling increases and the study of national concepts and ideals increases.

## 2. Research Problem

Research Problem Starts from the fact that current reality of teaching history at secondary level is largely lacking in meeting its expectations. it is a reality based on traditional teaching methods that focus on the student's memory without focusing on his mind and developing his skills and this led to poor level of cognitive achievement and historical research skills among Students.

So the current research is trying to verify the effectiveness of use on the Marzano model to develop the achievement and some historical research skills for Secondary school students.

Therefore, the following historical question was formulated: what is the effectiveness of using Marzano model to develop the achievement and historical research skills for Secondary school students?

This required answering the following sub-questions:

1. What historical research skills should be developed for Secondary school students?
2. What is the suggested proposal for the cognitive virtual tour based on Marzano model to develop the achievement and some historical skills for school students?
3. What is the effectiveness of using Cognitive virtual tours based on Marzano model in teaching history at first grade of secondary school in:
  - A. Developing the achievement.
  - B. Developing some historical skills.

## 3. Aims of the Study

1. The Current research aims to Prepare a list of historical research skills must be

developed for first grade secondary Students.

2. recognize the effectiveness of using cognitive virtual tour based on Marzano model to develop achievement.
3. recognize the effectiveness of using cognitive virtual tours based on Marzano model to develop historical research skills.

#### 4. Importance of the Study

1. The current research can contribute to the following:
2. Presentation a list of historical research skills that can be developed a teaching history of at first grade secondary students.
3. Presentation of procedural model how to use Cognitive virtual tours based on Marzano model in teaching history at Secondary level.
4. Draw the attention of the developers of history Curricula to the need to pay attention to virtual tours and employ technological innovations in the educational process .

#### 5. Research delimitations:

1. Objective delimitations: Teaching of only history two units of the first grade secondary history Course. Unit one: entrance to the Civilization of Egypt and the ancient world, unit two: Egypt's ancient Civilization of pharaonic.
2. Spatial delimitations: The research has been applied to first grade secondary Students at Alsalam secondary school in Ismailia.
3. Temporal delimitations: Current research has been applied in the first term (2019 -2020).

#### 6. Research hypotheses:

1. There are Statistically Significant differences at level (0.01) between the average grades of the students of the two groups (experimental and control) in the post application of the summative test for achievement test and for experimental group students.
2. There are Statistically Significant differences at level (0.01) between the average grades of the students of the two groups (experimental and control) in the post application of the summative test for historical research skills test and for experimental group students.

#### 7. Theoretical framework:

The current research was also interested in using cognitive virtual tours based on Marzano model

development of achievement, and historical research so this part of the research addresses the following ayes:

The first axis: Cognitive tours.

The second axis: Marzano model for education dimensions.

The third axis: Marzano model's relationship to cognitive tours.

The fourth axis: Historical research skills.

#### First: Cognitive virtual tours (web Quests)

With less develop in the use of the internet for educational, purposes, many technological innovations have emerged, the most important of which was web Quests.

Tuan has identified cognitive virtual tours as educational activities depend on research process in the form of web for direct access to information in the least possible effect, it also aims to develop mental abilities including understanding, analysis and construction of learners (Tuan , 2011 , 42)

Halat has identified it as learner -centric teaching entrance based on constructive theory, Creative and Critical Banking and collaborative learning environment (Halat, 2008, 109).

Whereas Kocoglu has identified them as technological applications based on the internet through which learners take a range of Steps to complete a task. Related to certain topic.

Through Previous definitions, it can be inferred that Cognitive virtual tours (web Quests) focus on the following:

1. Good implementation for the internet and multimedia as a source of information.
2. Build on the constructive theory, a learner is knowledge Seeker, responsible for his learning and knowledge builder.
3. Develop higher thinking skills such as solving Critical and creative thinking problems:

- Virtual tours features (web Quests).
- It is an educational pattern based on constructive theory.
- Encourages teamwork and exchange ideas and thoughts among learners with emphasis on sub-learning as well.
- Aims to develop learner's mental abilities.
- Gives students the opportunity to research and investigate.
- Secures use of internet.
- Takes into account individual differences among learners.
- Develops higher thinking skills for students (Pelliccione & Craggs,2007,5)
- Virtual tours types.

- Both (Dodge 1995, 23; Lamb, 2004, 6) referred to two types of the web.

A. Short term web Quest (from one to three classes).

It's often intended to gown Students knowledge and integrate their understanding and retrieval.

This type is used with beginners who are not experienced in search engine usage techniques. It may also be used as an initial stage to prepare for the long term web Quest term web Quest.

B. long term web Quest (from one week to a whole month)

It is centered around questions that require advanced mental process such as analysis, construction and evaluation, this type is provided in the form of presentation, research working papers.

Component elements of virtual tours (web Quest).

1. Introduction: It's a stage that provides students with background Knowledge of the research subject (lesson) and its way evokes their motivation to research (Allan & Street, 2007, 15).
2. Tasks: This Component includes identifying the core question of the task that revolves around the idea of the lesson. These tasks are required to be realistic, practical and enforceable, help in learning and exchange ideas and information (Stoks, 2002, 13).
3. Procedures: In this step, the steps to follow are determined to carry out the required tasks.
4. Resources: The teacher selects websites that are closely related to the pivotal question (tasks) learners are required to deal with.
5. Evaluation: The distribution of grades is explained to the research or idea and to the previous stages.
6. Conclusion: Conclusion is summary of web Quest's pivotal idea in which the search was around it, and in it, the learners are reminded of the skills that will be acquired at the end of the tour.

### Second: Marzano model for learning dimensions:

Marzano's model is based on structural philosophy, which focuses on the fact that learning is an active process by learner and previous knowledge is prerequisite for good learning to occur as learner builds his new knowledge learning on the basis of his previous knowledge. Learning happens better when the individual faced by real meaningful tasks and conceptual growth results from social negotiation of meaning and is done in collaborative

environment (Chitanana, 2012,25).

Dimensions of Marzano's model for learning dimensions. Marzano indicate that learning process involves and requires live patterns of thinking that learner experiences of while learning dimensions of learning. They are:

1. Positive attitudes and realizations towards learning.
2. Knowledge acquisition and integration.
3. Deepening and refining knowledge.
4. Meaningful use of knowledge.
5. Habits of the productive mind.

Marzano sees that learning in the end, a stage of interaction among these dimensions so that the study programmers do not stop at the mere acquisition of knowledge, always go to the deepest goal of building the habits of mind, which will help the learner to stages of lifelong learning (Marzano, 1998,10).

Marzano has identified several mental habits he deems necessary for students to acquire through learning process, among them:

1. Self-regulated thinking and learning.
2. Critical thinking.
3. Creative thinking (Marzano, 1998, 20).

Teaching by using Marzano's model:

Marzano has identified three methods of learning dimension planning used by the teacher when preparing to teach specific content as follows:

1. First: method focuses on knowledge.
2. Second: focuses on issues.
3. Third: method focuses on Student's exploration.

### Third: Relationship between Marzano model for learning dimensions and cognitive virtual tours (web Quest)

Marzano's model of learning dimensions is based on Structural philosophy that interests in learner and its own knowledge building and he is a knowledge Seeker. Accordingly, learners' ability must be used for real tasks Knowledge resources.

Cognitive virtual tours (web Quests) make this possible and cognitive virtual tours are compatible with structural philosophy in the set of points, they are:

1. Learner activity as learning is an active process.
2. Cumulative, where the Learner builds Knowledge based on previous or past Knowledge.
3. Integration, where the learner extends his Knowledge and links it to current knowledge (Witts, 2008, 9).

Kuswara, et al (2008, 20) believes that

construction is the right entrance for designing e-learning environments based on the second generation (web 2.0).

Paurelle (2003, 7) also believes that constructive theory is the ideal theory for designing an e-learning environment. It encourages learners to build knowledge through their past and previous experiences.

Considering the nature of Marzano model and virtual tours many of the important common axes on each focuses can be within the framework of effective leaning .they are:

- Cognitive virtual tours provide an exciting and simulating learning environment for learning and this is what Marčana's first dimension fecules on and positive attitudes towards learning
- Cognitive virtual tours include a set of tasks (analysis, judgment investigation, following up, and creative production) and so on, which contributes to the meaning use of knowledge and is what the fourth dimension of the Marzano model focuses on ( meaningful use of Knowledge)
- Cognitive virtual tours aim to develop higher thinking skill and this is what fifth dimension for Marzano focuses on (habits of productive mind )

In the light of the above, the current study seeks to design Cognitive Virtual tours (web Quest) based on the Marzano model based on structural philosophy.

#### **Fourth: Historical research Skills:**

It is a set of skills that learner must possess when dealing with historical subject, it consists of temporal thinking, historical presentation, historical interpretation, the use of sources of history and decision- making

This includes the ability to weigh evidences and link between causes and results, detect false explanation and the ability to compare and judge the value of information on the basis of the sources derived from it and it is for some, a set of skills that students should. Passes and help them study history and understand its roots and understand reality problems and issues dealing with sources. Judging the value of information analysing it and drawing conclusions. Some also consider that historical research skills are :

1. The ability to deal with historical material
2. The ability to understand historical situations
3. The ability to discover historical evidence
4. The ability to conclude from historical evidence

5. The ability to understand historical evidence (John Nichol , 1994 , 17).

In general, historical research skills are those skills that the student must have when studying history, such as the ability to understand historical subject and clarification of the reasons for historical event .the ability to interpret and issue judgments

Given the importance of historical research study aimed to develop historical research skills among Secondary school students using some teaching strategies used to teach social studies such as tours, computer pagrammel stories and museum shows.

The study identified historical research skills in the following:

- establish historical events
- historical interpretations
- use of historical sources
- writing historical researches
- writing historical report

The study proved the effectiveness of this strategy in developing historical research for students of the experimental group

• The study of (Ghada, 2007) aimed to reveal the impact of teaching a unit in history in the light of overall quality standars on the development of historical research skills for secondary school students and the results revealed the unit's proposed effectiveness in developing research Skills for Secondary school Students

• The study of (Amany, 2013) also aimed to develop historical research skills for preparatory school in history students by using suggested strategy in history subject by using, you tube website and to study revealed statistically significant differences among student's average Pre and post application Scorer to test historical research skills in favor of past application that demonstrates effectiveness suggested strategy in developing historical research skills.

Research method:

In light of the nature and objectives of the research, the following were used:

- The descriptive analytical method
- Experimental method

Research variable:

-The independent experimental variable:

Cognitive virtual tours based on Marzano model

-The two dependent variables:

A- Academic achievement

B- Historical research Skills

Research Sample: The research Sample consisted of (60) female Students from the first year of Secondary school at Al Salam in Ismailia. They are divided into two group

- The first is experimental (30) Students and the

Second is Control (30) Students.

Research tools:

- The research tools consisted of

First: The Cognitive achievement test:

- The aim of the test: The test aims to determine the level of achievement of the first year secondary students of the knowledge. And information contained the experimental unit

- determining the type of test and the distributions of the scores: The test items are formulated in the form of objective questions, the total scores were (40) points, distributed over (40) questions

- The exploratory experiment of the test: the test was applied to a sample of first -year secondary Students from outside the main study sample, it amounted to (21) Students in order to identify

- Calculation of the stability coefficients of the test: the reliability coefficient (Alpha) of Cronbach's was calculated, and that using the statistical programs (SPSS), its value was (0,91) which is an acceptable statistically value

- Calculation of the ease and difficulty coefficient of the test questions, the coefficient of ease and difficulty was Calculated for each of the test items, and the item whose ease coefficient is greater than (0.8) has been deleted as it is very easy, as well as the item whose difficulty Coefficient is less than (0.2) where it is very difficult , the Coefficient of ease and Coefficient of difficulty for the selection vocabulary ranged between (0.2) and (0.8)

- The final image of the test: after the steps of building the test were completed, and its validity and stability were confirmed, the test consisted of (40) questions.

Second: The historical research skills test:

- The objective of the test. The test aims to determine the extent to which first - year secondary students are able to acquire historical research skills.

- determining the type of test and the distribution of the scores The test vocabulary was formulated in the form of essay questions , and the total test scores were (50) points distributed over (25) questions

- The exploratory experiment of the test: The test was applied to the same sample on which the achievement test was applied in order to know:

- Calculation of the test stability coefficient: The reliability coefficient (Alpha) Cronbach's was Calculated, and that using the statistical programs (SPSS), its value was 0.83 which is a statistically accepted value

- Calculation of the Coefficient of ease and difficulty for the selection vocabulary ranged between (0,2) and (0,8)

- the final image of the lest : After the steps of Constructing the test were completed and its

validity and reliability were confirmed ,the test consisted of (25) questions, including the historical research skills be measured .

Ensure that the two research groups are equal:

- To ensure that the two research groups are equal then the ( Cognitive achievement test- historical research skills test ) was applied to the two research groups before , then the results of the pre application were analysed using the Levene's Test the SPSS program , and the following resulted were reached.

### 8. Results:

The results of Levene's Test to test the homogeneity of the control group and the experimental group in the pre application of the cognitive test and the historical research skills test showed in table 1.

Table 1: Shows the Levene's test for the homogeneity of the control group and the experimental group in the pre application of the cognitive test and the historical research skills test.

It's clear from the results of the table (1) that the value of the level of moral significance for Achievement test is (0.148), and it's equal to (0.515) for selecting historical

Test	Value	Degree of freedom (1)	Degree of freedom (2)	Value of the level of moral significance
Achievement	2.149	1	58	0.148
Historical Research Skills	0.429	1	58	0.515

research skills, which are greater than level (0.05) and therefore accept the imposition of homogeneity between the experimental and control groups at the level of the experimental pre application associated with the achievement test and historical research skills test.

### The first hypothesis:

It states that: There is a statistically significant difference at the level of significance (0.05) he mean scores of the experimental group and the control group in the post application of the achievement test, in favor of the scores of experimental group.

To verify the validity of the hypothesis, then use the mean scores of the students of the two research group, and the deviations values for these Scores, and (T) value between the mean scores through SPSS program, and that using T-test for two independent Samples, the results was shown in the

following table.

Table 2: shows T-test results of the differences between the mean scores of the students of the Control group and experimental group in the past application of the achievement test.

It's clear from the results of the table (2) that the value of p.value is equal to (0.000) which is less than of (0.05), which confirms the existence of

Group	N	Mean	Std. Deviation	T	df	Sig. (2-tailed)	$\eta^2$
Control	30	28.40	4.35	-7.180	58	0.000	0.470
Experimental	30	35.30	2.96				

statistically differences of the Significance level (0.05) between the mean Scores of the students of the control group and the experimental group, in the post application of the achievement test.

**The second hypothesis:**

The states that: there is a statistically significant difference of the level of significance (0.05) between the mean scores of the students of the experimental group and the control group in the post application to test historical research skills in favor of the scores of the experimental group. To verify the hypothesis, the mean scores of the two research groups and the deviation standard for these scores, and the value of (T) for differences between the mean scores by SPSS program, using T-test for two independent Samples, and the results are as in table 3:

Table 3: shows The results of T-test for differences between the mean scores of the students of the control group and experimental group in the post application of the historical research skills

It's clear from the result of table (3) that the value of p.value is equal to (0.000) which is less than the value of (0.05), which confirms the existence of

Group	N	Mean	Std. Deviation	T	df	Sig. (2-tailed)	$\eta^2$
Control	30	30.96	6.89	-7.421	58	0.000	0.486
Experimental	30	42.90	5.48				

statistically differences at level (0.05) between the mean scores of the students of the control group and the experimental group, in the post application of the historical research skills test.

**9. Discussing and interpreting the results of the research:**

The results of the current research can be interpreted as follows

- The steps of Cognitive virtual tours based on Marzano model came in sequential and interconnected manner. as each step plays a specific role in preparation for the next step ,which help the students to organize and acquire the Subject better than the traditional methods of teaching
- Cognitive virtual tours based on Marzano model concerned with presenting concepts and ideas at the beginning of each tour in the form of Conceptual diagrams that helped to clarify the relationships between Concepts, Knowledge and main and secondary information, and to find common relationships between those concepts , Knowledge and information, classify them and identify the similarities and differences between them and Compare them with information existing in the cognitive structure of the students which contributed to the organization of knowledge, storage, assimilation and ease of retrieval, and making the learning process meaningful, all of which led to a higher achievement and historical research skills among the students of the experimental group
- Cognitive virtual tours based on Marzano model provided a set of educational media necessary to implement and study each tour, to include internet sites related to the topics, historical texts and documents, where a group of historical texts were selected through which students Can Carry out educational activities aimed to develop their historical research skills.
- The nature of Cognitive virtual tours based on Marzano model, which provided learning as meaningful tasks, Carried out by distributing students into groups. The Success of the tour depends on participation, discussion, and interaction between members of each group to implement the task required, which Contributed to strengthening and deepening the understanding of the content.
- The cognitive virtual tours based on Marzano model provided a Suitable environment for learners to interact and participate through dialogues and provided a wide range of sources to display educational content in more than one form and more than one medium, which helped the students achieve a better understanding of Concepts, Knowledge and information and make the content of the tours more steadfast in their minds.

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