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The effectiveness of a multimedia program in the achievement of chemistry among students of the fourth scientific grade

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ABSTRACT

The present study aims at finding out (the effectiveness of a multimedia program in achieving chemistry among fourth-grade students) to achieve the objectives of the research, the following hypotheses s were formulated: "There is no difference with statistical significance at the level of (0.05) between the average of degrees of the experimental group of students who were taught according to the multimedia program and the average degree of the ordinary group who were taught according to the normal method in the achievement test in chemistry". The experimental controlled design (experimental group and ordinary group) was selected with no equivalent of the pre- posttest in achievement. The sample consisted of (50) students in the Canadian high school for boya re which was deliberately chosen. An experimental group consisted of (23) students who studied according to the multimedia program and (27) students in the ordinary group studied according to the conventional method. The experimental and control groups were compared in the following variables: (age (months), intelligence, average grade of science, and previous information. (19) Daily teaching plan for the experimental group and the ordinary group was prepared. The experimental group was organized according to the stages of the multimedia program and the teaching plans of the control group according to the normal method The experiment was applied in the first semester of the academic year (2019-2020) and the experiment lasted (3)months. The tool was prepared: the achievement test. The tests consisted of (40) multiple choice types, and the psychometric properties were calculated and stabilized, the results were statistically treated using the t-test of two independent samples of equal number. The results showed that the experimental group studying according to a multimedia program was superior to

their peers in the ordinary group, which was studied according to the usual way in the achievement test. Therefore, the current study recommends using the multimedia program in the teaching of chemistry, and proposes to conduct other studies of different stages and subjects to identify its effect in different variables.

Introduction

Research problem: Looking at the reality of science teaching in schools, we find that it gives great attention to the goal of information and its collection, as if this were the only goal of education. Educational situations, as the means used by teachers limited of the educational process efficiency. The problem of low achievement in Mad of the chemistry of the basic problems, you should make learning a comprehensive benefit of learners in their future and make their learning process and functional, market d many specialists called for in education to stay away from teaching chemical information they include many different skills rather than abstract information, as well as to takeaways n a positive trend towards chemistry, making a de so to many of the problems in learning chemistry. The teachers of chemistry to choose for themselves the electronic modern techniques to perform the function and skill in teaching lead to the achievement of the lesson objectives and evaluation and have an impact positively in the life of modern man, has demonstrated many of these effectiveness studies programs and multimedia in raising the level of achievement and many educational and other terms of problems the researcher works as a teacher of chemistry has observed a clear decline in the collection and weakness in solving chemical problems and difficulty learning, the teacher on the shoulders of the need to achieve the efficiency of the educational process. Based on this has felt the researcher that the research problem and the importance of preparing the program of multimedia in raising the level of achievement at the fourth grade science students, has emerged as the research problem in the following question: "What is the effectiveness of the program of multimedia in the collection of material in the fourth grade science students?"

Research importance: Education plays a major role in the life of societies and human nations, as it is the mainstay of their development and prosperity, and its means of survival and continuity and facing the challenges and developments of knowledge and technology in our current era and the continuation of his scientific and cognitive activity, to ensure his interaction with society. (Hamshary, 2001: 11). The accelerating technological revolution came, which is accelerating day by day, and it is of great importance, and it is not limited to serving the human being and his various functional practices, but it has a role that has a clear impact in developing his skills, increasing his knowledge, refining his abilities and competencies, and keeping pace with scientific and technological progress (Ashour, 2009: 338). The rapid development in many different fields, especially in the field of information and communication technology, where new types of computer-powered educational aids have emerged , as many studies have proven their effectiveness and success, and their results exceeded the traditional educational methods and means by a large percentage, due to what is characterized by these Modern means are among the influential qualities in the teaching and learning process, which was characterized by interaction, excitement and suspense (Qatawi, 7 : 395). In light of the advanced information

development that we live in, this requires a development of learning, and an encouragement for learners to take responsibility in dealing with this unlimited progress of knowledge, which will not be successful, unless appropriate methods and methods are adopted, such as multimedia learning, which has become an important means in education. Multimedia is one of the technological innovations that have educational and educational values in raising the efficiency of the teaching-learning process. It is considered a more feasible and effective educational system, as the focus of the learning motives, including curiosity and curiosity (Azmi, 2011: 7). The use of multimedia programs to form concepts and perceptions of useful scientific, whatever the language of sound and clear in the delivery of information to learners, it remains a temporary impact and limited compared with the impact of the use of technological means that T. increased capacity for understanding and comprehension, and had to form values and trends, including advanced Possibilities of accurate observation, and practice of using the scientific thinking method, to solve problems, and arrange the ideas formed by the learners. It also provides the learner with experiences that bring his reality closer to him, and this leads to an increase in his experiences, and makes him more prepared for self-learning, formation and evaluation; This gives the teaching and learning process a global character, and an exit from the narrow local framework. (Al-Bayati 24:2016). In light of the above highlights, the search in the following points:

- 1 - This current research is a remedial attempt to criticize the traditional teaching methods.
- 2- The research results may contribute to conducting many researches in the field of multimedia in increasing the achievement and the tendency towards chemistry.
- 3- Chemistry teachers, science teachers and program planners may benefit from this research in designing curricula according to e-learning.

Research goal: the aim of the research to verify: "the effectiveness of the program in the collection of multimedia chemistry at the fourth - grade science students"

Varzi of research: there is no difference is statistically significant at the level of (0.05) between the average scores of students who are studying for a multimedia program, the average scores of students who are studying in the usual way in the academic achievement of chemistry.

Research limits: The current research is limited to:

1. Students A for class scientific fourth in the (Canadian junior boys) Walt seventh Directorate of T. Rbia Baghdad / Karkh for the first academic year 2018 - 2019.
- 2- Applying and employing a multimedia program in the first three chapters of the fourth grade science book of chemistry.

Definition of terms:

The program: Program Know him: (Al-Saadi: 2004): It is the totality of experiences and activities that are planned and implemented in a specific context and during a specific period of time to achieve desired goals. (Saadi 2004: 131) is known as the researcher said the program of " that the organization and planned activities and offering a group on students fourth grade science of order to develop the scientific and professional according to some prepare them for the different skills adopted by the researcher for this purpose.

Multimedia: multimediate know him: (Zeitoun : 2002) It is the use of the computer in displaying and integrating texts, graphics and images with links and tools that allow the user to economy, interaction, innovation and communication. (Zaytoun2002: 242) and the researcher defines it procedurally as "it is a comprehensive integration of some technological elements, or more clearly for programs that combine text, audio, image, video and drawing with high quality."

Collection: Achievement knows him:(Al-Laqqani and Ali, 1999) that it is: "The extent to which students comprehend what they have learned of certain information through what they have studied , and it is measured by the degree that students obtain in achievement tests prepared for this purpose." (Laqqany and 1999: 58) and the researcher knows that procedurally that: " the outcome of what he acquired the student educational experience destined primarily in the testing of chemical information was not the birth of chemistry fourth grade science , which Acts Dah researcher for this purpose."

Literature review

Multimedia is a group of media that contains a static image, moving image, sound and text and all work under the control of a computer at the same time, in addition to the availability of an interactive environment, where interaction is the main element in multimedia programs and multimedia applications are characterized by interaction, so information flows in two directions From program to learner and learner to program, multimedia programs are the most powerful way to write educational programs in a way that enables the presentation and exchange of ideas and information. (Al-Bayati 23:2016)

Multimedia features:

Multimedia is a term to describe the Union of software and hardware that enables the learner to make use of text, images, audio, presentations, animations and video clips, and reminds all of (Rantisi p less 2011) some of their characteristics , namely:

- 1- Presenting information to the learner in an interesting way.
- 2- It pushes the learner to communicate in the presentation of the educational material.
- 3- It can be transferred from one computer to another.

4- Presenting information to the learner in an adaptive manner.

5- The presentation of information is accompanied by a sound, image or video appropriate to the nature of the information

6- The learner moves through the media freely and according to his desire. (Rantisi,2011:83)

Multimedia and the justification for its use in the educational process

Good learning does not take place through self-activity that the learner performs in order to acquire knowledge, skills and other experiences on his own.

Multiple educational goals, so that the teacher and the textbook cannot achieve them alone

The emergence of many means that can achieve some educational goals, including television, computers and the Internet

Increasing the problems that education suffers from, such as the increase in the number of students and the individual differences between students.

The emergence of self-learning, which calls for finding modern means to increase the effectiveness of teach (Al-Bayati 22: 2016).

The importance of multimedia in the educational process:

Multimedia gives learners the opportunity to be seekers of new information through modern technology and increases their awareness of its wide uses and educational importance. Ismail (2001: 164) sees the importance of multimedia in the following aspects:

It helps learners to link information in terms of its presentation in various forms including written text, graphics, images, video clips, and sound effects.

It is concerned with cooperative education between learners and faculty members.

Help learners think beyond thinking.

Its use leads to the attractiveness of learning and fun in the educational process.

Lead learners to rush to learn. (Ismail2001: 164)

Principles of multimedia design:

There are a set of principles that should be taken into account when producing and designing multimedia in order to meet the needs of both teachers and learners: (Afaneh, et al., 2005).

- Take into account the basic requirements of the current curriculum.
- Take into account current teaching practices.

- To take into account to reduce the time being, uh , his home through educational practices.
- It meets the specific needs of educators through the ability to integrate the product.
- Designing a product that contributes to developing learners' investigative skills
- Designing a product that helps learners think about what they know and what they gain.
- Multimedia software design should allow easy employment of learning environments.
- Formatting of multimedia programs must be free from linguistic or punctuation errors. (Afaneh, 2005 : 87)

Educational benefits of multimedia:

- The researcher said that several multi - media benefits are as follows:
- Help the teacher organize the lesson plan.
- It helps save time and effort for the lesson.
- Develop the element of perseverance, activity and suspense among learners.

Previous studies:

-study (Vrtacnik , 2000) The study aimed to investigate the effect of using interactive media in developing students' knowledge of some concepts in chemistry, and the study followed the experimental method on a sample of (50) students from the third year of secondary school in Slovenia. A significant impact is of the interactive media in developing the chemical concepts of the experimental group students and their awareness of these concepts. The study recommended the use of interactive media in teaching chemical concepts.

-Al-Otaibi Study (2011): The study aimed to investigate the impact of using multimedia activities in blended learning on the listening skill and satisfaction of female students at the Royal University for Women. The study followed the experimental method, and the study sample consisted of (43) female students from the Royal University for Women. The study tools consisted of a listening test and a scale to measure the degree of satisfaction with multimedia activities. The results revealed that there were statistically significant differences between the experimental and control groups in the listening test in favor of the experimental group. The results showed the experimental group's satisfaction with the multimedia activities. The study recommended the use of multimedia in teaching.

-Study of Mohamed (2012): DVT study to reveal the effectiveness of the Program based on interactive multimedia in the development of some of the skills of science presentations for students of teachers in the Department of Arabic, The study followed the quasi - experimental, and the study sample consisted of 21 female students from The Faculty of Education in Arish, and the study tools consisted of an achievement test, a test of presentation skills, and an observation card to evaluate the performance of students in presentation skills. The study revealed that there were statistically significant differences between the pre and post application in the achievement test and the presentation skills test, and that these differences were in

favor of the post application in the two tests. The study recommended making use of the proposed program in teaching Arabic.

Methodology

First: the experimental design

The experimental design with partial control (experimental group and control group) was chosen and can be explained as follows:

the group	parity	independent variable	dependent variable
Experimental	-chronological age -Test) OTIS- Lennon (for intelligence -Collection in material chemistry	multimedia program	An achievement test
control	- Previous information	the usual way	

Second, the research community: Is this research community grade student of the fourth scientific in the Directorate General of Education in Baghdad's Karkh / province 1, for the academic year (2019 - 2020).

Third: the research sample: coordinated with the Department of (junior Canadian Boys) Boys It includes the school (182) students in grade fourth scientific divided between (3) people. And randomly were selected Division (a) to be the experimental group taught by (Bern A vol multimedia) and the Division (c) for the group to be the control taught by (the usual way), bringing total sample (50) students.

Fourth: Equality of the two research groups: Equality means making the experimental and control groups completely equivalent, that is, similar in all variables except for the independent variable whose impact is to be studied (Al-Assaf, 1987: 312), and despite the fact that all members of the research sample are in one geographical area and from a similar social and economic milieu. To some extent and distribution of the people were randomly assigned by the school administration, but the researcher said ere Ta do equal groups variables pa Tia as shown in the following table:

Variables	the group		SMA			T value	

		the number		variance	degree of freedom	calculated	tabular	Statistical significance
Chronological age	Experimental	23	189.90	27.44		23	189.90	nonfunctional
	control	27	191.05	37.51				
The previous information	Experimental	23	13.17	9.34	48	0.424	2,021	nonfunctional
	control	27	13.59	12.65				
Intelligence	Experimental	23	20.65	5.92	48	0.912	2,021	nonfunctional
	control	27	22.31	6.68				
chemistry grades	Experimental	23	80.40	248.43	48	1.698	2,021	nonfunctional
	control	27	73.20	203.71				

Fifth: Accessories Search :After informing the researcher Wen on the chemistry book and its contents (Grade IV Scientific) and the analysis of the first quarter, second and fifth , the researcher formulated (180) depending on the purpose behaviorally Bloom 's Taxonomy (BloomIn the cognitive domain for the first four levels only, all of them are: Knowledge . Comprehension/application/ Analysis

Thus, the agreed behavioral objectives are distributed over the first, second and fifth chapters, as shown in the following table .

Distribution of behavioral objectives between levels and between academic content

sequence the classroom	Study levels Content	cognitive domain				Total
		remember	absorb	Application	analyzing	
the first	Basic concepts in chemistry	22	18	5	2	47

The second	Gases	42	43	1	2	88
Fifth	nuclear chemistry	22	18	2	3	45
Total		86	86	79	8	7

In addition to the numbers (19) plans for the experimental group, and the same for the control group, as for the test map, it is as follows:

Exam map for achievement test items by semester

the classroom	Academic content			Percentage of behavioral goals levels				
	Chapter title	Number of shares	Importance	remember %49	absorb %44	Application %4	analyzing %3	Total 100 %
the first	Basic concepts in chemistry	5	26	5	4.5 ≈ 5	0.4 ≈ 0	0.3 ≈ 0	10
The second	Gases	8	42	8.2 ≈ 8	7.3 ≈ 7	0.6 ≈ 1	0.6 ≈ 1	17
Fifth	nuclear chemistry	6	32	6.2 ≈ 6	5.6 ≈ 6	0.5 ≈ 1	0.4 ≈ 0	13
Total		19	100%	19	18	2	1	40

Sixth : Search Tool: I have a researcher promising that the test achievement component (40) paragraph, have been identified paragraphs of the test of the type of multiple choice, and was extracted virtual sincerity based on the equation (Cooper), which showed 80% of the views of the arbitrators in education and methods of generating Yassin chemistry , and applying the initial experience of the exploratory test of achievement ; in order to identify ambiguities and determine the necessary test

time was 45 minutes, the second exploratory experiment which was conducted to conduct statistical analysis of the paragraphs of the test extracted the difficulty factor of (0, 36 - 0, 73) is Good and acceptable, and the strength of discrimination was (0, 21 - 0.73) and it is considered good and acceptable and within the specified range, as well as the effectiveness of the wrong alternatives was revealed, and the results were of a negative value, as the values ranged between (0.0 3 - , 0.2 9) and thus be effective alternatives, as well as the stability of the test was extracted in a way (Kiodr-Richardson 20) where he reached (0, 74) and thus the stability coefficient is high.

Q Aava : Statistical methods: was adopted Altaia test for two independent samples (for the purpose of knowledge of equality of the two groups in the variables) , and the equation of the difficulty factor for substantive paragraphs, the equation of the power of discrimination, and the equation of effective alternatives (for the purpose of knowing the properties Alsekoumtre tool search), and the equation of Cooper, and contrast, the equation Kiodr Richardson-20 as statistical means of processing search results.

Results

This chapter includes a presentation of the findings of the research, according to the research objective and its hypotheses, and then its discussion and interpretation in the light of the treatments, then a statement of the conclusions, recommendations and suggestions as follows:

Results Presentation

For the purpose of verifying the null hypothesis which states that: “There is no statistically significant difference at the level of significance” 0.05) between the average scores of students who study in the multimedia program and the average scores of students who study in the usual way in academic achievement in chemistry.”

a. You will extract the arithmetic mean of the experimental group which is (18.48) and the variance) 9. 52), as for the control group, the arithmetic mean was) 14 . 56) and the variance (16.31), and by adopting an equation (t-test) At the level of significance (0.05) and the degree of freedom (48), reaching the calculated value of T (3 . 80) which is greater than the value of the crosstab of (2,021), the following table shows that .

the group	the number	SMA	variance	degree of freedom	Calculated v	Tabular T	Statistical significance at the 0.05. significance level
Experimental	23	18.48	9.52	48	3.80	2,021	function
control	27	14.56	16.31				

This indicates that the difference between the mean of the differences is statistically significant in favor of the experimental group that was studied with the multimedia program, and thus rejects the null hypothesis.

Results Interpretation

The current study sees the superiority of the experimental group to group students in a control group does not test grades due to the following:

1. The multimedia program has led to increased motivation towards learning, since this of programs to work to increase the desire of the learners in the search for facts and inquiry about the relationship of information by increasing thinking, linking relationships among them, and the large number of questions, and inquiries.
2. The multimedia program t included various activities help to absorb and apply the information effectively, and emphasizes the interaction between the learners in the educational process, impact and facilitates learning transition, and moving them towards success and the search for what is new, and then increased t this e programs Of the positive enthusiasm among students of the fourth scientific grade.

Conclusions

In light of the results of the current research, the following can be concluded: The use of the multimedia program in teaching chemistry has a positive effect in raising the level of achievement of fourth grade students.

Recommendation

In light of the findings of the research, the current study recommends the following:

- 1- The adoption of the fourth grade male and female teachers on the multimedia program in teaching chemistry, because of its positive impact on increasing achievement.
2. Curriculum development studies, and updated in the stage of junior high , and linked by means of modern technology education .
3. Students stage junior high real need to programs multimedia, and make them think instead of saving teleprompter.

Propositions

As a continuation of the current research, the current study proposes the following:

- 1- Conducting a study on the effectiveness of the multimedia program in modifying the misunderstanding of chemical concepts for fourth- grade students and developing their scientific thinking.

2- Conducting similar studies on other chapters of chemistry, or from other study subjects, for different stages and materials.

3- Conducting a study similar to the current study in revealing the effectiveness of the multimedia program in other variables not approved in the current study, such as attitudes, motivation, acquiring chemical concepts, critical thinking, problem-solving ability, scientific curiosity, ...etc.

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