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The Effect of Teaching Laboratory Work Using Computer Simulation in the Achievement of Tenth Grade Students in the Field of Physics in the Soil Directorate of the Southern Mazar District

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ABSTRACT
This study aimed to investigate the effect of teaching laboratory work using computer simulation on the achievement of tenth grade students in physics, and to find out whether there are differences due to the gender variable. The experimental sample (40) male and female students and the female control (39) male and female students from the Directorate of Education of the Southern Mazar Brigade for the academic year (2010/2011) AD, and they were divided into four groups, two experimental and two controlling, so that there were two divisions for females, one control and the other experimental, as well as for males. A computer simulation program and an achievement test were built, the significance of the test validity and stability were verified, and the equivalence of the experimental and control groups was confirmed by applying a pre-test. The study concluded that there were differences between the two groups in the achievement of tenth grade students in physics due to the method of teaching and in favor of the experimental group (which was taught by computer simulation).
KEYWORDS: COMPUTER SIMULATION, LABORATORY WORK
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INTRODUCTION

The most important characteristic of our current era is the amazing scientific and technical developments that have taken place and the acceleration in that development, and the clear and obvious impact of this development on the various aspects of life. All fields, including education, and since the Jordanian educational system is characterized by development and keeps pace with those developments in the field of computer use, this educational system has been updated and strengthened with information and communication technology to be a key element in this system to improve, develop, and direct it in line with trends and what it requires to prepare a generation that can contribute to building the nation and its economy. Shammi (2008) indicates that the educational process has witnessed, during the past few years, the increasing use of technological innovations, which had the effect of changing the roles of the elements of the educational process, changing the role of the teacher, and the role of the learner, so the learner became a positive active, responsible for his learning process. Searches, discovers, deals with and interacts with educational materials.

The educational process in the information age after the Internet has adopted modern and global trends, and it has become the availability of electronic learning environments, based on the use of multiple media, and relies on research and investigation, and the teacher is a facilitator of the learning and teaching processes (Al-Sarayra et al., 2006).

In the field of natural sciences and to achieve mastery, (Al-Buraiki, 2006) stresses the necessity of using the school laboratory in teaching science lessons because of its positive impact on providing learners with scientific thinking skills and appropriate directions.

In order to overcome this kind of difficulties, the teacher can, by using computer-based teaching and learning patterns, present simulations of some topics, and with the help of the computer it is possible to represent and embody things and imitate reality because of its capabilities to create graphics, still and moving images, colors and sound. Educational simulation is an effective method in education where the learning environment is discovery, and simulation programs are used to increase realism, develop skills, social interaction and problem-solving skills (Shammy, 2008). (Kelsey, 2010) indicates that the history of computer simulation in teaching extends to the development of the computer itself. It dates back to the days of the Manhattan Project, and it can be said that the method of using simulation in the teaching-learning process has existed since learners began solving problems through role-playing and using data, where it was done without adding technology, and this may go back to the history of John Dewey laboratory schools at least in the early days of roughly the last century. Looking at both approaches, computer simulations specifically designed for teaching and learning have evolved over the past two to three decades to allow for dynamic discovery-oriented learning.

Believing that education is a planned and intended process that aims at positive, educationally desirable

changes in the learner's behavior, learning and thinking, the Ministry of Education in Jordan has attached great importance to innovation and development in learning methods, strategies and techniques. The computer and its technologies were introduced into the classroom in order to provide appropriate learning opportunities for students. Even the computer within the educational programs is necessary as one of the basic sources for receiving scientific knowledge and concepts and developing the main skills. Hence, this study comes to investigate the effect of teaching laboratory work using computer simulation on the achievement of tenth grade students in physics in Jordan.

THE STUDY PROBLEM

Through the researcher's work as a physics teacher for the tenth grade, and her feeling of the weaknesses faced by learners in achievement in physics by conducting laboratory scientific experiments by traditional methods, and also based on the difficulty of conducting or presenting some scientific experiments within the school laboratory or completing them in order to see Learners and its results, the researcher decided to employ the computer in the school laboratory to provide an alternative learning environment through a program to know its impact on learners' achievement in physics. The problem of the study also lies in what the results of international tests, such as TIMSS (Trends for International Studies of Science and Mathematics), and PISA (Program for International Student Assessment, and focuses on specific areas such as reading, science and mathematics), revealed that the Jordanian students' position is still around the average and has not exceeded that. This case, according to the opinion of many teachers, may be attributed to the fact that science teachers are interested in employing traditional teaching methods, including the method of displaying laboratory work in the usual ways. Hence, this study came in order to employ a modern teaching method, and try to know the effect of teaching laboratory work using computer simulation In the achievement of the tenth grade students in physics in the Directorate of Education of the Southern Mazar Brigade by answering the following two questions:

1. Are there statistically significant differences at the significance level ($\alpha \geq 0.05$) in the achievement of tenth grade students in physics that are attributed to the teaching method (laboratory work by computer simulation, or the usual laboratory presentation method)?
2. Are there statistically significant differences at the significance level ($\alpha \geq 0.05$) in the achievement of tenth grade students in physics that are attributed to gender (male, female)?

OBJECTIVES OF THE STUDY

This study aims to:

1. Providing assistance and offering solutions to the problems and difficulties of learning the practical side (practical experiences) of physics for tenth grade students using a computer simulation program.
2. Detection of the effect of using the simulation program for practical experiments on the achievement of tenth grade students in physics compared with the usual method of conducting practical experiments in the school science laboratory. 3. Activating the role of the relevant technological and computer programs available at the centers and resources of the Ministry of Education to become effective in helping learners to implement practical experiments for physics and other science subjects so that learners of all stages can simulate them while they are in school or outside school hours.

THE IMPORTANCE OF STUDYING

The importance of the study stems from the following:

FIRST: THEORETICAL IMPORTANCE

1. Through the results of the study, it is possible to provide an educational program using computer simulations for use by teachers in teaching physical experiments.
2. The study can contribute to adding a new study to local studies, which are relatively few on this subject within the limits of the researcher's knowledge - researchers can benefit from it to play and those interested in this field.

SECOND: APPLICATION IMPORTANCE

1. It may constitute an objective response to what educators are calling for at the present time in keeping pace with modern trends in teaching and experimenting with educational methods and models that may lead to positive results in the educational process.
2. It is also hoped that the results of this study will contribute to strengthening the role of the Ministry of Education and educational institutions in developing technological educational programs concerned with learning the practical aspect of physics in particular and science in general, as well as may benefit in motivating stakeholders in the Ministry of Education to provide an appropriate environment for the employment of such programs and increase effectiveness and efficiency.

TERMINOLOGY OF STUDY:

In this study, a set of terms that should be defined are as follows:

ORDINARY LABORATORY DEMONSTRATION METHOD: A method of conducting practical experiments related to the lens unit in a science laboratory (physics) that require the preparation of materials, equipment and tools by the laboratory evaluator and the physics teacher, and which are carried out by the teacher, and the role of the learner is limited to observation, limited participation, recording observations and answering for questions about the experience.

COMPUTER SIMULATION: A modern educational method that depends on the capabilities of computer programs with multimedia such as Flash. Teachers and learners use the computer to conduct experiments with lenses in the physics subject for the tenth grade, where the learner conducts an experiment using the computer that enables him to carry out the steps of the experiment himself and take measurements of his experience and enter them and run on them Calculations, analysis and conclusion of the results. These experiments were obtained through the audio system, the internet, and the computerized physics software stored on the CD named (I love physics), which was prepared in cooperation between the experts of the Japanese International Cooperation Agency team and the Curriculum Directorate of the Ministry of Education and the company Curriculum for educational techniques for computing the physics curriculum for the first year of secondary science, which is scheduled in Jordanian schools in the academic year (2003/2004).

ACADEMIC ACHIEVEMENT: It is the amount of progress that the learner reaches to achieve the objectives of the lenses unit, and it is measured by the learners' scores obtained, whether they studied using the usual laboratory presentation method or the computer simulation method, after applying an achievement test prepared by the researcher for the purposes of the study and applying it after Completion of the study experience.

PHYSICS SUBJECT: It is the scientific content represented in the physics book for the tenth-grade students, which the Ministry of Education decided to teach in Jordan's schools for the year 2011/210, and the lenses unit from the mentioned subject will be used.

TENTH GRADE STUDENTS: They are male and female students whose ages range between (15-16) years and who are classified in the upper basic stage in public schools in the education system in Jordan.

THE LIMITS OF THE STUDY

This study will be limited to the following:

HUMAN LIMITS: the tenth-grade students.

SPATIALLIMITS: Southern Mazar Brigade, Karak Governorate.

TIME LIMITS: the second semester of the 2010/2011 academic year.

THEORETICAL FRAMEWORK FOR RESEARCH AND PREVIOUS STUDIES

THEORETICAL FRAMEWORK

The scientific and technical progress that we are witnessing today has led to many changes in various fields of life: cultural, social, and educational. Therefore, it has become necessary to introduce modern technology into the educational process in its various stages to keep pace with developments in this world, and educators seek to develop through good planning to achieve the needs of society and the demands of learners' growth (Nabhan, 2008a). The computer is one of the most important modern technological means. This method has advantages that make it different from other means because of its large and effective role in teaching and learning processes for the sake of mastery, and for large numbers of learners at one time. Through the computer learning strategy, dialogue and interaction between the learner and the computer takes place using the keyboard, where the educational program is entered into the computer that includes information, questions and problems to be solved by the learner. The computer screen, and then the learner enters the answer, and receives the response immediately, written on the screen or audible, and after completing the answers, the errors made by the learner are displayed, corrected by the program, and finally the degree of the answer is estimated for the learner (Atiya, 2008).

THE EFFECT OF COMPUTER USES ON ACHIEVEMENT IN SCIENCE SUBJECTS

The use of the computer in teaching science subjects increases learners' ability to learn scientific facts, and increases their experience in scientific processes. Perhaps the best way to raise the level of educational attainment using technology is the process that integrates learners into more interactive learning, as in simulation and modeling programs. Those that are developed by teachers are the most effective because teachers are more familiar with the learning objectives, and when using computers in the learning and teaching processes, the effects were obvious and positive. The computer-enhanced educational process increases the knowledge and skills of students studying science in secondary schools (Amour, 2007).

SIMULATION CONCEPT

Al-Halafawi defines simulation as “computer programs designed to put the learner in the face of situations that are very similar to reality and urge him to interact with this reality in specific foundations and rules, and in the light of this interaction the learner issues a set of decisions and responses” (Al-Halafawi, 2006).

Saraya believes that simulation is "the abstraction or simplification of some situations derived from real life, and this is particularly true in science lessons, where the computer presents the steps for an experiment or chemical reaction, and the possibilities resulting from it, and the student is trained on these programs without risk or assignment such as programs Driving cars” (Saraya, 2007, COR, p. 135).

SIMULATION SOFTWARE

The simulation method allows placing the learner in an unreal adapted situation to resemble real situations in reality. This method requires:

1. Providing an unreal situation to represent the problem exposes the learner.
2. The learner has to act as if it were a real situation to reach the solution.
3. Providing the learner with feedback, through his performance in the same situation.
4. Make appropriate adjustments in the learner's behavior until he reaches the solution.
5. The use and application of modified behavior in similar situations (Atiya, 2008).

The steps for designing educational simulation are as follows:

1. Define and analyze educational simulation content.
2. Analyzing the characteristics of learners in terms of age and previous experience.
3. The procedural formulation of educational objectives.
4. Application and use, by preliminary trial; In order to identify deficiencies, determine the appropriate time for implementation, prepare individuals, prepare the place, determine learners' responses, implementation and evaluation (Shammy, 2008).

There are many educational computer programs, and their educational employment varies according to these programs. Some of them are prepared for training and testing or the so-called leadership programs or teaching systems, and if artificial intelligence is introduced with this program, it is called “smart teaching systems”, through educational computer programs Some educational situations can be simulated through educational games, where the teacher provides explanations and information for some lessons, exercises and questions, as well as diagnostic and remedial procedures and simulations of some topics.) .

COMPUTER FEATURES IN EDUCATION

Attia (2008) believes that the computer has many advantages in education that can be summarized in the following:

1. Individualizing education by providing opportunities for the learner to learn according to his speed and ability and by relying on the
2. Making the learner positive and active by providing opportunities for interaction between the learner and the device.
3. Providing immediate feedback, which is provided to the learner if he responds to the situation or the educational unit. 4- High accuracy in the operations performed.
4. Stimulating the motivation for learning, by providing the learner with the opportunity to think about the answer, immediate reinforcement and educational games.
5. Addressing individual differences among learners.
6. Realism, by providing an educational environment close to reality due to the available images, colors and activities, thus increasing the effectiveness of education.
7. Presenting and simulating certain phenomena in nature, as this cannot be done in the study room without a computer due to its danger or impossibility.
8. Justifications for the use of computers in education:

There are many justifications for using computers in education, including:

1. The information revolution and the explosion of knowledge that the current era is witnessing, resulting from the development of means of communication, and in order to organize this huge amount of knowledge, and store it, and ease of dealing with it, the computer appeared as the best way to achieve this.
2. The need for speed in obtaining information, as the computer can achieve this with little effort and less time.
3. The need for skill and proficiency in the performance of business, and complex mathematical operations, as the capabilities that characterize the computer in terms of accuracy and proficiency were able to achieve this.
4. Providing manpower, as it is possible to perform computer-mediated work equivalent to what is done by a large group of skilled manpower in various works and fields.
5. Providing solutions to some learning difficulties problems, as the computer contributes to helping to solve this type of problem for those who suffer from mild mental retardation, and for others who suffer from

problems with communication skills (Saada, 2003).

SIMULATION TYPES

Simulation is divided into four types according to Al-Issa (1993), as mentioned in Al-Momani (2006), as follows:

1. **PHYSICAL SIMULATION:** It is used to treat physical things such as: flying an airplane, operating a voltmeter, using tools and chemicals.
2. **PROCEDURAL SIMULATION**: aims to learn steps or a series of actions such as: training in the steps of operating a machine or device or diagnosing some diseases in the field of medicine.
3. **SITUATIONAL SIMULATION,** and here the learner has an active role in the events that occur. It displays not only rules and strategies as in the previous types, and through repetition of the simulation the learner can discover appropriate responses to situations.
4. **PROCESS SIMULATION:** The role of the learner here is only an external observer and experimenter. This type of simulation helps the learner to understand concepts. For example, the learner cannot see electrons or the movement and speed of light, but they can be seen in practical simulations. Simulations are divided into two main types:

A. Simulation that teaches about something, including physical and practical simulation; Any simulation of learning things or learning from watching another person.
B. Simulation of learning how to do things: including positive and procedural simulations, i.e. learning how to do things or how to learn from watching another person.

EDUCATIONAL COMPUTER SIMULATION IN SCIENCE TEACHING

The prescribed educational curricula include many situations and phenomena that need to be approximated to the learner

And linking it to reality by imitating it, and simulation programs are programs that simulate reality, including the activities and educational exercises that it includes, such as training the driver to drive a car in the streets, as this needs models that are presented to him and practiced before the actual practice. Actual practice, as there are some phenomena that are difficult to practice realistically, so they are trained using simulation programs, such as bombing and blasting operations (Atiya, 2008).

There are several factors that require the use of computer educational simulation programs, including:

1. The dangers arising from conducting the educational situation, such as: some chemical experiments.
2. The high financial cost of conducting some experiments.
3. The difficulty of applying the situation in practice, such as: studying the installation of a nuclear reactor, and controlling nuclear accelerators.
4. Provide the necessary time for the experiment.
5. It provides realism and real training for the learner without being exposed to dangers (Zaytoon, 2002).

Educational computer simulation programs are among the strongest and best educational computer programs if programmed correctly. They depend on the principle of constructivist philosophy, where learning occurs through practical experience and through trial and error, and this would facilitate the formation of the concept to be learned and thus the experiment achieves its goal. Educational computer simulation programs facilitate the conduct of experiments that are impossible to perform in practice, for example: when conducting a scientific experiment in the field of chemistry, it is impossible to allow novice learners to conduct the dangerous experiment in a real way because of the reactions and dangerous substances that may result from it (Al-Ghazw, 2004).

Another example relates to the origin of the Earth, where the modern scientific theory says that the Earth. It originated from the explosion of a star other than the sun, and by using simulation programs, this abstract information is presented in a realistic and tangible form on the computer screen, where the process of the star's explosion is sound and image and the formation of the Earth (Saraya, 2007).

Among the phenomena and events that simulation programs can represent are: nuclear accidents, chemical reactions, weather conditions, medical technologies, biological processes, spaceship systems, aircraft cockpits, and safety tests. That the learner uses simulation software for a long period of time while encouraging them to continue activities based on the thinking skills included in the simulation software (Amour, 2007)

Simulation advantages

Simulation programs offer many advantages, including the following:

1- Accuracy and realism in representing the real reality.
2- Employing computer and multimedia capabilities to bring the situation closer to reality.
3- Learning without the occurrence of dangers or damages.
4- Providing immediate feedback.
5- Increasing the motivation to learn by providing excitement and fun.
6- Taking into account individual differences among learners; Each of them performs the experiment within his

own speed and ability (Al-Ghazwa, 2004).

SIMULATION DISADVANTAGES

Simulation programs have some disadvantages, including the following:

1. The need for elaborate and coordinated planning by the teacher and programmer together.
2. The need for a large amount of organized information.
3. The need for computers with advanced capabilities; In order for these programs to function effectively.
4. The need for sufficient knowledge in teaching methods and content presentation methods to suit the characteristics of learners (Al-Ghazw, 2004).

PREVIOUS STUDIES

Abu Al-Saud (2006) conducted a study aimed at investigating the effectiveness of a program based on simulation method in developing some metacognitive skills in the science curriculum among ninth grade students in Gaza. The number of students was (74) and two sections of the ninth grade students in the elementary elementary school of Ruqaya for girls reached (90) students within the schools affiliated to the Directorate of Education - West Gaza. The students' achievement, and the study showed the following results: that there are differences in the post-test between the mean scores of the students of the control group and the average scores of the students in the experimental group in favor of the experimental group, and that there are differences in the post-test between the mean scores of the students of the control group and the average scores of the learners in the experimental group in favor of the group It was found that there are differences in the post-test between the mean scores of the female students in the control group and the mean scores of the female learners in the experimental group for h experimental group.

Ibrahim (2006) conducted a study aimed at measuring the effectiveness of using physical experiment software on the achievement of third-grade secondary students. The study sample consisted of (22) male and female students at the Sudanese International Academy School in the state of Khartoum. They were divided into two experimental groups that were taught the same selected unit using The experimental and control software was taught the same unit in the traditional way, and the researcher found that there are statistically significant differences between the control group and the experimental group in the post test in favor of the experimental group, which is taught using physical experiment software.

Al-Deek (2010) conducted a study aimed at investigating the effect of computer simulation on the immediate and delayed achievement of eleventh grade students, their attitudes towards learning the mechanics unit, and towards their teacher in government schools affiliated to the South Nablus Directorate. The study sample consisted of (117) male and female students, distributed over four divisions in four different schools (two schools for males and two schools for females). And they studied using computer simulation as a teaching method, and the number of its members was (64), including (36) male students and (28) female students. A female student, and a tribal knowledge test was prepared to ensure that the control and experimental groups were equivalent. The study concluded that there are statistically significant differences between the average achievement of the eleventh grade students in science and the average of their attitudes towards learning physics, and towards its teacher who learned physics by computer simulation and who learned it in the traditional way, and there are no differences between the average achievement of the eleventh grade students in science and the average of their attitudes towards learning physics And towards her teacher who learned her by computer simulation due to gender, and the absence of differences between the average achievement of eleventh grade students in physics, and the averages of their attitudes towards learning physics, and towards her teacher attributed to the interaction between the teaching method and gender and the absence of differences between the achievement averages of eleventh grade students in science In the instantaneous dimensional knowledge test, and the averages of their achievement in the deferred dimensional cognitive test.

COMMENTING ON PREVIOUS STUDIES

It is noted that previous studies dealt with the method of computer simulation in several topics, such as the study (The Cock, 2010) and the study (Al-Qarni, 2006), where these studies dealt with the method of computer simulation in learning mechanics and science, and some studies investigated the effectiveness of a technical program based on the simulation method in developing Some metacognitive skills in the science curriculum for ninth grade students as a study (Abu Al-Saud, 2006), and there are studies that investigate the effect of using a virtual learning environment in science education on the achievement of sixth grade students as a study (Khaled, 2008).

The population and sample of this study are in government schools affiliated to the Jordanian Ministry of Education, the Southern Mazar District Directorate, and for the tenth grade, and thus it was not similar to any of the previous studies. undergraduate.

This study dealt with the subject of physics, while some previous studies dealt with other subjects, such as

chemistry, biology, earth sciences, and astronomy.

METHODOLOGY AND DESIGN

STUDY APPROACH:

In this study, the quasi-experimental research method was used, and the study sample consisted of four groups, two of which were experimental (one for males, and one for females), and two control groups (one for males and one for females).

STUDY COMMUNITY:

The study population consisted of all the students of the tenth grade of basic education who belong to the schools of the Directorate of Education of the Southern Mazar Brigade, and their number is (1,192) male and female students, including (531) male and (661) female students, and the number of males is (21). It reached (25) for the academic year (2011/2010 AD), "according to the statistics of the Planning Department of the Directorate of Education of the Southern Mazar District".

THE STUDY SAMPLE:

The study sample consisted of (79) male and female students of the tenth grade in the Jaafar bin Abi Talib Secondary School for Boys, and Al-Hussainiya Secondary School for Girls. These two schools and their proximity to the researcher's workplace, the willingness of the physics teacher, the values and values of the science laboratory, and the values and values of the computer lab to contribute to the completion of this study. A) a control group, and (B) an experimental group, and the following table (1) shows their distribution according to group and gender.

TABLE(1): DISTRIBUTION OF STUDENTS ACCORDING TO GROUP AND GENDER

Gender	Group	Number
Male	Experimental	20
	Control	19
	Total	39
Female	Experimental	20
	Control	20
	Total	40
Total		79

STUDY TOOLS:

The following tools were used:

A. A computer simulation program.
B. Achievement test: A multiple-choice achievement test was built in the physics subject for tenth grade students, which consists of (30) test items, by following the following steps:

1. Content analysis of the lenses unit from the physics subject for the tenth grade of the first semester.
2. Derivation and formulation of a set of behavioral objectives in the light of Bloom's classification in the cognitive domain.
3. Preparing a table of specifications for the content of the educational material (lens unit) showing the distribution of the paragraphs on the content elements and levels of mental behavior.
4. Writing the paragraphs in accordance with the specification table, and distributing the test items according to the levels of behavior in the cognitive domain.
5. The validity and reliability of the test were verified

FIRST: THE VALIDITY OF THE TEST:

The validity of the test was verified in two ways:

Using the validity associated with a test, by monitoring the students' scores for the physics subject in the first semester of the year 2010/2011, for an exploratory sample consisting of two divisions, one for males and the other for females, amounting to (34) male and female students. The correlation coefficient between the scores of the students of the exploratory sample was extracted. On the test with their quarterly grades to obtain the validity of the test, it reached (887). Second: - The apparent honesty of the test was verified by presenting the test to a group of specialized and experienced arbitrators from Mutah University professors, supervisors and teachers of physics with experience, measurement and evaluation, in order to verify the extent to which the test represented the content and levels of questions according to Bloom's classification, and the clarity of its linguistic formulation. And Appendix (C) shows the names of the judges of the test.

SECOND: THE STABILITY OF THE TEST:

The reliability of the test was verified using the Test Retest by applying the test to the exploratory sample (mentioned previously), then re-applying the test to the same exploratory sample members again two weeks after the first application, and calculating the correlation coefficient between the students' scores on the two tests, The reliability coefficient was (0.902), which indicates the stability of the test.

The psychometric properties of the test items were also extracted as follows:

FIRST: THE DISCRIMINATION COEFFICIENT

The paragraph discrimination coefficient was calculated by calculating the correlation coefficient between the student's score on the item and his total score on the test. The calculated discrimination coefficients ranged between (255.658.) and this table shows (2).

SECOND: COEFFICIENT OF DIFFICULTY

The difficulty coefficient for each of the test items was calculated and ranged between (85.35.) and Table (2) between that:

TABLE(2): COEFFICIENTS OF DISCRIMINATION AND DIFFICULTY OF TEST ITEMS

Item NO.	Discrimination coefficient	Difficulty coefficient	Item NO.	Discrimination coefficient	Difficulty coefficient	Item NO.	Discrimination coefficient	Difficulty coefficient
1	.350*	.73	11	.392*	.79	21	.345*	.50
2	.366*	.70	12	.351*	.85	22	.658*	.47
3	.411*	.65	13	.371*	.65	23	.451*	.56
4	.408*	.70	14	.255	.59	24	.307 *	.56
5	.427*	.79	15	.380*	.35	25	.445*	.53
6	.392*	.50	16	.390*	.62	26	.371*	.65
7	.434*	.67	17	.525*	.38	27	.641*	.50
8	.509*	.56	18	.479*	.59	28	.349*	.53
9	.519*	.56	19	.499*	.56	29	.488*	.50
10	.421*	.60	20	.399*	.47	30	.480*	.56

By following up on the values of the coefficients of difficulty and discrimination, it is noted that they were acceptable, except for paragraphs No. (24,14), in which the value of the discrimination coefficient was low and needed to make adjustments, and the appropriate amendment was made to it.

STUDY PROCEDURES

The study was conducted according to the following steps:

1. The study problem was identified and the study plan was written.
2. A program was prepared to simulate the experiments of lenses on a computer to suit the educational content of the subject of lenses in the physics subject for the tenth grade, based on the computerized physics software on the CD called (I love physics), the electronic system (EduWave), and the Internet.
3. Building an achievement test commensurate with the objectives of the educational content in the textbook, according to a specification table, and its validity and reliability were verified.
4. The school whose students will be the sample of the study was determined and selected, and they were randomly divided from their equivalence. into two groups, control and experimental.
5. Visiting science laboratories and computer laboratories for the schools under study, ensuring the availability of the necessary materials, and installing computerized experiments on computers.
6. A pre-test was applied to the students of the two groups to confirm.
7. The program was started by applying it to the experimental sample, and experiments were conducted in the usual way on the control sample, and the application continued with five classes.
8. Conducting the post-measurement process on the students of the two groups.
9. Conducting the necessary statistical operations to ensure the impact of the post-program, and come up with the appropriate results and recommendations.

STUDY VARIABLES:

The study includes the following variables:

A- The independent variable: the method of teaching.

VARIABLE LEVELS:

1- Computer simulation method in teaching laboratory work.

2- The normal laboratory presentation method.

B- The dependent variable: academic achievement.

STATISTICAL PROCESSORS

1- Arithmetic means and standard deviations.
2- An independent t-test.

PRESENTATION AND DISCUSSION OF THE STUDY RESULTS AND RECOMMENDATIONS

This chapter presents the results obtained by answering the study questions, discussing these results in the light of theoretical literature and previous studies, and making appropriate recommendations.

FINDINGS RELATED TO THE ANSWERS TO THE STUDY QUESTIONS

THE RESULTS RELATED TO THE FIRST STUDY QUESTION AND ITS TEXT "Are there statistically significant differences at the significance level (a ≥ 0.05) in the achievement of tenth grade students in physics that are attributed to the teaching method (laboratory work by computer simulation, or the usual laboratory presentation method)?

To answer the first question of the study, the arithmetic means and standard deviations of students' performance on the pre-achievement test were calculated according to the group (control and experimental), and table (3) shows that:

TABLE (3): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF STUDENTS' PERFORMANCE ON THE PRE-ACHIEVEMENT TEST ACCORDING TOTHE GROUP (CONTROL AND EXPERIMENTAL)

Group	Arithmetic Mean	Standard Deviation
Experimental	15.67	71.2
Control	16,05	2.64

It is clear from Table (3) that there are apparent differences between the arithmetic circles for the students' performance on the achievement test, and to find out whether these differences are statistically significant, the T-test was used for independent samples and Table (4) shows that:

TABLE (4): T-TEST RESULTS FOR INDEPENDENT SAMPLES OF STUDENTS' PERFORMANCE ON THE PRE-ACHIEVEMENT TEST

Contrast source	average differences	standard error	degree of freedom	value(t)	Indication level
achievement test	0.603	0.376-	77	0.624	0.534

It is noticed from Table (4) that there are no statistically significant differences at the level of significance (a ≥ 0.05) between the control and experimental groups, where the value of (T) = -0.624, which enables us to say that both groups are equivalent.

After completing the teaching of the unit by the two methods, the post-test was applied and the results of the students of the two groups were monitored and the arithmetic means and standard deviations of the students' performance on the achievement test were calculated according to the group (control and experimental) and the table (5) shows the results:

TABLE (5): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF STUDENTS' PERFORMANCE ON THE POST-ACHIEVEMENT TEST ACCORDING TO THE ARITHMETIC MEAN OF THE GROUP (CONTROL AND EXPERIMENTAL)

Group	Arithmetic Mean	Standard Deviation
Experimental	23.05	4.86
Control	20.13	4.40

It is clear from Table (5) that there are apparent differences between the arithmetic circles for the students' performance on the achievement test, and to find out whether these differences are statistically significant, the T-test was used for independent samples and Table (6) shows that:

TABLE(6): THE RESULTS OF THE INDEPENDENT SAMPLES (T) TEST FOR STUDENTS' PERFORMANCE ON THE POST-ACHIEVEMENT TEST

Contrast source	average differences	standard error	degree of freedom	value(t)	Indication level
achievement test	2.92	1.04	77	2.80	0.006

It is noticed from Table (6) that there are statistically significant differences at the level of significance (a ≥ 0.05) between the control and experimental groups, where the value of (T) = 2.80, and by following up on the top in Table (5), it is clear that the differences are statistically significant when (a ≥ 0.05) is in favor of the experimental group, where its arithmetic mean was (23.05), which is higher than the arithmetic mean of the control group, which was (20.13), and from here it can be said that there is an effect of the method of teaching laboratory work using simulation.

RESULTS RELATED TO THE SECOND STUDY QUESTION, WHICH READS: "Are there statistically significant differences in the achievement of tenth grade students in physics that are attributed to gender (male, female)?"

To answer the second question of the study, the arithmetic means and standard deviations of the students' performance on the post-achievement test were calculated according to gender, and Table (7) shows that:

TABLE (7): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF STUDENTS' PERFORMANCE ON THE ACHIEVEMENT TEST DIMENSIONAL BY GENDER

Gender	Arithmetic Mean	Standard Deviation
Male	21.90	3.44
Female	21.32	5.97

It is clear from Table (7) that there are apparent differences between the arithmetic circles for the performance of students on the achievement test by gender, and to find out whether these differences are statistically significant, the T-test was used for independent samples and Table (8) shows that:

TABLE (8): THE RESULTS OF THE INDEPENDENT SAMPLES (T) TEST FOR STUDENTS' PERFORMANCE ON THE POST-ACHIEVEMENT TEST BY GENDER

Contrast source	average differences	standard error	degree of freedom	value(t)	Indication level
achievement test	0.592	1.09	77	0.542	0.590

It is noticed from Table (8) that there are no statistically significant differences at the significance level ($a \geq 0.05$) in the performance of male and female students on the post-achievement test, where the value of (T) = 0.542, which indicates that the teaching method is effective in raising the level of achievement of male and female students.

DISCUSSING THE RESULTS

This part deals with the discussion of the findings of the study.

DISCUSS THE RESULTS RELATED TO THE FIRST QUESTION:

In the light of the results of the analysis of the performance of the study sample on the post-achievement test included in tables (5), (6) for the control and experimental groups according to the variable of teaching method, it turns out that there are statistically significant differences in the achievement of tenth grade students in the physics subject, and in favor of the experimental group that was used The computer simulation method, and this may be attributed to the fact that the method of teaching laboratory work by computer simulation takes into account the learner's ability and self-speed in the teaching process, and it is a new method of teaching, which led to an increase in the interaction of learners with the content of the educational material, which contributed to increasing their achievement and the presence of an impact on the method of teaching. This result can also be attributed to the fact that the learners in the experimental group were exposed to a continuous learning process, which raised their sufficiency, in addition to the computer simulation method focusing on the senses, practice, training and expanding what the learners go through in terms of experiences that provide them with the possibility of individual and group learning. It is the traditional way. The computer simulation method is characterized by its sufficiency in full response to make learning according to the abilities and needs of the learners, as it is from experiencing reality and provides them with education in an attractive way, and it also gives the learner the opportunity to correct his mistakes and the mistakes of his colleagues. In addition to the above, the elements of suspense and excitement in the educational situation provided by the computer simulation method, specifically when the learner studies a dry material such as physics, as it provides him with information in an environment where sound, image, movement and text are available. It provides him with a degree of freedom to make mistakes without exposing him to danger, or the simulation makes the learner an active and active individual. It also gives him the opportunity to control the situation to varying degrees, as a result of his understanding of these situations and his interaction with them. Self. This result agreed with the results of the study (Al-Deek, 2010), the study (Ibrahim, 2006), the study (Abu Al-Saud, 2006), the study (Al-Qarni, 2006), the study (Al-Fitinat, 2005), the Giti study (2005), and the study (Giti, 2005). Bayrak (2008), and the study of Youssef Wallaby (YUSUF & AFOLABI, 2010).

DISCUSS THE RESULTS RELATED TO THE SECOND QUESTION:

The results of the analysis according to Tables (7), (8) indicated that there were no differences between students of both sexes in terms of the level of their achievement in Physics using the computer simulation method of teaching laboratory work. This may be due to the similarity of educational conditions between males and females, or to the fact that the subject is the same for both sexes, and males and females may have equal interest. This result can also be explained by the fact that the students of the experimental group of both sexes were active

participants in reaching scientific information through computer simulation, correcting their answers, self-evaluation, and their learning in an orderly and sequential manner, and their practice of problem-solving and exploration, which consequently led to equal opportunities for understanding, And assimilation, analysis, synthesis, concentration and understanding of information, the learner learns according to his abilities and energies, and this is what the simulation learning environment offers in terms of excitement and attractiveness for both sexes to the same degree. Learner. This result has an important educational significance in that it enables learners, regardless of gender, to benefit from this method that increases their achievement. This result agreed with the results of the study (Al-Fatinaat, 2005), the rooster study, 2010), and the study of Youssef Wavolabi (2010, YUSUF & AFOLABI).

RECOMMENDATIONS

1. Based on the results obtained, the researcher can recommend the following:
2. Holding training courses for physics teachers to use modern techniques in education such as computer simulation and activating it in laboratory classes.
3. Adopting a simulation teaching strategy in order for students to acquire higher mental skills such as the ability to analyze, construct, evaluate, scientific research, discover, and solve problems.
4. Conducting more research and studies through which the educational material is prepared in a computer simulation style, so that it is presented to students as a basic reference instead of textbooks, after the students have been trained on the mechanism of use and how to apply experiments according to methods of discovery, investigation and problem solving.

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