

The Effectiveness of Using Animation on Sciences Academic Achievement of the Third Grade Students in Al-Jeezah District schools

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Abstract

This study aimed to define the effectiveness of using animation on the academic achievement in science of the third grade students in Al-Jeezah district schools. The sample of the study was intentionally selected and it consisted of (69) students. The sample was distributed into two groups: the first was an experimental group which included (35) students. The Second group which was consisted of 34 students was taught by the traditional way, It consisted of (34) students. The study showed that there were differences with statistical significance ($\alpha \geq 0.05$) in the application of the post test and the achievement test for the benefit of experimental groups taught by using animation clips.

Keywords: Animation, Academic Achievement, Effectiveness..

Introduction

Modern technology has created an unprecedented leap in the field of information and knowledge, because the widespread of the internet has allowed to access the information with ease and speed. Therefore, technology had to be used in all fields of life and knowledge including educational field in order to increase learners' intellectual and cognitive abilities (Jafar, Al-Sersawi, 2019).

Hence, it is imperative that people use the tremendous technical and information revolution to advance in the educational process by preparing and developing programs to use them as a tool that nurtures the human inclinations, creativity and comprehension capabilities. Also, modern technology has contributed in development of the educational process, scientific research and teaching aids; where new electronic technologies have been introduced to raise the level of learning and education. Many areas of technology have recently emerged that provide an interactive environment that makes education extend with flexibility and cognitive creativity that contribute to raise the student's achievement (Octariana, 2014).

Animation in our time has become one of the most important forms of media and art through which the visual content is formulated creatively and differently, where animation is important and effective element in formulation of child's personality and considered one of his main interests, because it offers a charming world with its attractive stories whose events centered in imagination. Thus, child is attracted to these cartoons and associated with them greatly (Al-Shdaifat, 2006).

Problem statement

The science subject is a scientific subject related to human experience, it has been observed in recent years, rapid and successive progress in the field of scientific knowledge, as the subject of science is characterized by being a subject that adds mental and cognitive skills to the student (Al-Bagouri, 2016).

Since the subject of science is the compilation of facts with the assumptions, inventions and discoveries that occur about the universe and its elements, as it includes all possible various mechanisms of thinking, analysis, experiments or evidence in addition to being

responsible for the interpretation of all phenomena in nature. Therefore, there are difficulties occur while teaching science for the basic stage that the subject matter for students is often involve topics that are crowded with facts and concepts (Al-Shalabi, 2019).

viewing the availability of new effective teaching methods that raise motivation among learners and simplify scientific concepts for them, the importance of using animation in science has emerged; Because it provides them with educational material within programs that attract students (Al-Baqaa and others, 2013).

Through the work of the researcher as a teacher for the third basic class, she faced many problems in explaining and clarifying some concepts and topics such as food chains and how the photosynthesis or even trying to explain the mechanism of the work of the five senses in a way that remains stuck in the mind of the student. So, science is one of the fields that most need practical application, which has impeded the delivery of information between the sender and the receiver. As a result, the research problem has emerged.

Several studies such as a study of (Abu Sahmud, 2018) , a study of (Abu Al Sheikh, 2019) and the study of (Momani and others, 2011) have urged the use of animation in the teaching of science for the basic stage and recommended to conduct further studies on the use of animation in a wider spatial and temporal framework. Also, the conference "Modern Communication Technologies and their Role in Caring for Effective Learning Societies" recommended further studies on the use of animation in teaching (2019).

Research Purpose

The study aimed to identify the extent of the effectiveness of the use of animation in the educational process and how the impact will be on the student's academic achievement in science for first stage students (third grade) in government schools in Jiza District.

Research question

What is the effectiveness of using animation for the third-grade students' achievement of the science subject in Giza District?

Research hypotheses

There were no statistically significant differences at the level of significance ($0.05 \geq \alpha$) between the mean scores of students in both the experimental and control groups in the post-test of science for third-grade primary students in government schools in the Jiza District; It is attributed to the method of teaching (the use of animation, the usual method).

Literature Review

Al-Zaq (2014) conducted a study aimed to discover the effect of the use of motion pictures on developing language expression skills among fourth-grade students in the governorates of Gaza. Students distributed in randomly chosen classes, the researcher used a note card and written expression testing, and the results of the study showed that there are statistically significant differences between the mean scores of the experimental group and the average score of the control group in the test for the skill of written expression and the skill of oral expression.

Also, Brik and Balousha (2016) conducted a study aimed to identify the effectiveness of animation in acquiring nodal concepts and the trend towards them among students of the fifth basic class in Islamic education in schools in the West Gaza region of Palestine, where the researchers adopted the descriptive, analytical and experimental approach, a random sample was chosen, where the number of participants reached (70) students, where the sample was divided into two groups, one of them was an experimental group consisting of (35) students, and a control group consisting of (35) students, the researchers built an achievement test, and the results also showed that there are statistically significant differences between the mean scores Experimental group and mean score of the control group in the achievement test results.

Faraj Allah, Karaz (2017) conducted a study aimed to reveal the effectiveness of a program based on the use of animation in developing the concepts of preparation for first graders at the Children's Association for the Deaf in Gaza, Palestine. The researchers used the semi-experimental approach, and a random sample was selected, consisting of (26) male and female students from the first grade students with hearing disability, and the two groups were divided equally, one experimental and the other control, where the results showed statistically significant differences in favor of the experimental group in the results of the post test.

Hammad et al. (2017) study aimed to reveal the effectiveness of an animation-based program in teaching history to develop thinking skills for middle school pupils. The researchers used the semi-experimental approach, and a sample of (144) male and female students was randomly selected at Ismail Al Qabbani School for Boys and Esmat Al-Afifi School for Girls in Egypt, where an experimental group consisting of (69) male and female students and a control group consisting of (75) were divided into two groups. Male and female students, a pre-dimensional visual thinking test was applied to the two groups, and the study results showed that animation works to ease the immobility that characterizes history subject.

Abu Hewar (2017) conducted a study aimed to reveal the effect of the use of animation on the development of concepts and skills of written expression among students of the fourth primary class in Gaza. The researcher followed the descriptive and experimental approach. The two groups were randomized, and the experimental group consisted of (40) female students who taught teaching using cartooning, and the control group consisted of (40) female students who taught the teaching in the usual way. Average score for the control group, and the use of animation contributes to developing concepts and skills of written expression.

The study of (sariyem, santoso, supriyana, 2017) aimed to reveal the effectiveness of animation in teaching dental care to deaf students, where researchers used the experimental method, the sample consisted of 30 students who were distributed into two experimental groups consisting of 15 students who were taught using animation, and the other was a control consisting of 15 students who received teaching in the usual way. A pre-post achievement test was designed to determine the extent of students' knowledge, and the results showed statistically significant differences in favor of the experimental group.

Abu Sahmud (2018) study aimed to demonstrate the effectiveness of the animation program in developing listening skills and reading comprehension in the Arabic language for second-grade primary students at Sheikh Ajleen Elementary School in Gaza, the researcher used the experimental approach, and the sample was selected from (76) Male and female students, and divided them into two groups, one of them was an experimental consisting of (39) students and the other was composed of (37) students. The researcher prepared a pre-test and post-test. The study revealed that the experimental group achieved higher proportions using animation for them and demonstrated that animation has a positive impact in enhancing students' ability to develop reading comprehension skills and oral expression.

Muna (2018) conducted a study aimed at demonstrating the effectiveness of using animation to teach folklore in English for the seventh grade, the researcher used the semi-experimental method. The sample consisted of 24 students in the wisdom school in Indonesia, and divided into two control groups consisting of 12 students who received teaching in the usual manner whereas the experimental manner consisted of 12 students who received instruction using animation, where the researcher prepared achievement news, and the test results showed a relative increase in favor of the experimental group.

Sheikh (2019) conducted a study aimed to reveal the effect of the use of animation in developing the skill of oral expression in the English language for fourth-grade students in private schools in the capital Amman, where the researcher used the semi-experimental approach, and a sample consisting of (51) was selected. Students were divided into two groups, one of them was experimental, consisting of (26) students, and they received teaching using animation, and the other was composed of (25) students who received teaching in the usual way, where the researcher prepared an achievement test. The study revealed that there were statistically significant differences between the average scores of the experimental group and the average of the control group grades, thus the study demonstrated that animation can be employed to develop oral expression.

Research Methodology

The researcher adopted the semi-experimental approach to its suitability for study purposes (Al-Howaimel, 2014) by creating two groups: the experimental group that will be taught using animation clips, and the control group that will be taught in the usual way (without using animation).

Research population

The study population consists of (1635) male and female students in the third grade in government schools in the Jiza District, who were between (8-9) years in the school year (2019-2020) (Ministry of Education, 2019-2020).

Research sample

Governmental schools that include (96) third-grade primary students were listed according to the statistics of the Ministry of

Education (2019-2020), and due to the difficulty of conducting the study on the whole of the study community, one school was chosen, which is (Nusseibeh Al-Mazniya Mixed Secondary School) intentionally because it is close to the place of residence of the researcher and the availability of the third basic class students and to take advantage of the available capabilities in addition to the presence of the interactive board in the school. The third primary class was chosen and the number of students is (69) students consisting of two divisions, where the classes were chosen in a simple random way as follows: The third primary class (B) students and the number of its students are (34) students which represents the control group The third primary class students (A) and the number of its students are (35) students which represents the experimental group.

Instrument

To achieve the aim of the current study, the researcher prepared an achievement test in the science subject. An achievement test was prepared in the science subject for the third grade students, and the test was held before students used animation, and then another test was done after using animation, and the test included fifteen paragraphs of multiple choice.

Validation of the study tool

The validity of the tool was verified by the validity of the content, Where the test presentation is attached to the discretionary scale for monitoring scores, lesson plan, and content analysis for a group of arbitrators who are specialized and experienced from faculty members in Jordanian universities and a number of educational supervisors and teachers for the first three grades. As in the appendix (9) they were asked to express their views on the formulation of the test questions, the extent of its accuracy, clarity, its representation of the goal and the extent of its suitability for the third grade students as per the appendix (8). The arbitrators' notes were used in a linguistic reworking of some paragraphs of Appendix (10), which appeared in its final form consisting of fifteen paragraphs.

Reliability of the study tool

The stability of the test was verified by applying it to the stability sample consisting of (18) students from outside the study sample, and the test - retest method was used with a fourteen-day interval between the two application times and the reliability factor was calculated using the Coder_ Richardson_20 as the coefficient reached reliability (0.95), and the internal consistency method (Cronbach Alpha) was used for the test items, as the coefficient of stability reached (0.94). The following table shows the reliability coefficients for the test items.

Difficulty and discrimination coefficients were calculated for achievement test items, and Table (2) shows these coefficients.

Research Results

First: Discussing the results related to the study question: What is the effectiveness of using animation in the academic achievement of science for the third basic class students in Giza District schools?

The hypothesis related to this question states that "there are no statistically significant differences at the level of significance ($0.05 \geq \alpha$) between the mean scores of students of the experimental and experimental groups in the post-test of science for third-grade primary students in government schools in the Giza District attributed to the method of teaching (Using animation, the usual way). With the aim of examining the hypothesis, the mean and standard deviations for the grades of the third basic class students of the two groups were calculated

in the academic achievement of the science subject and the results were as in Table No. (2):

Table (2) shows that there are no significant differences between the mean levels of the third grade of the control and experimental groups, and in the pre and posttests, where the results indicate that the arithmetic mean in the pre-test of the control group was (8.21) of (15) degrees, with a standard deviation (2.53), whereas the arithmetic mean in the pre-test of the experimental group was (7.74) out of (15) degrees, with a standard deviation (3.04), meaning that there is significant difference in the arithmetic mean between the two groups of (0.47).

The results also indicate that the mean for the post-test for the control group was (9.06) of (15) degrees, with a standard deviation (2.58), and the mean for the post-test for the experimental group was (12.26) of (15) degrees, with a standard deviation (2.20) thus, there is a significant difference in the mean (3.20) for the experimental group.

To find out whether the difference in the mean of the students' scores of the control and experimental groups in the post-application of the achievement test is statistically significant at the level of significance ($0.05 \geq \alpha$), and in order to isolate the difference between the two groups in the tribal application of the test, The ANOVA test has been conducted.

The results in the table show that there is a significant difference at the significance level ($0.05 \geq \alpha$) between the averages of the students' scores for the experimental group (which was subject to the use of animation in teaching) and the control group (which was subjected to teaching in the usual way), where the calculated value (F) was (40.744) This value is statistically significant, which means rejecting the null hypothesis which states that "there is no statistically significant difference at the level of significance ($0.05 \geq \alpha$) between the mean scores of the control and experimental groups in the academic achievement of science for students of the third primary class attributed to the use of animation in teaching." Which means there is an effect of the use of animation in teaching on the academic achievement of science for third grade students.

Table 1. Reliability coefficients for test

Study tool	Calculated stability factor			
	Cronbach Alpha	Coder-Richardson -20	Steady return	Half-tone segmentation
Achievement test	0.946	0.951	0.917	0.802

Table 2. Mean and Standard Deviations for the Third Grade Students' Scores for the Two Controlling and Experimental Groups in Pre-Post Academic Achievement

Group	size	Descriptive statistics	Pre-test	Post-test
Control	34	Mean	8.21	9.06
		Standard deviation	2.53	2.58
Experimental	35	Mean	7.74	12.26
		Standard deviation	3.04	2.20

Table 3. ANOVA test results

Source of variation	Sum of squares	Degree of freedom	Square means	F-value	P-value	Partial Eta Squared
PRE	71.446	1	71.446			
Group	194.375	1	194.375	40.970	.000	0.383
Error	313.122	66	4.744			
Total	560.986	68				

a. R Squared = .442 (Adjusted R Squared = .425)

To find out the impact of the use of animation in the educational process on academic achievement, an Eta square (η^2) with a value of (0.383) was calculated, meaning that 38% of the students' performance improvement for the experimental group in the post-test is due to the use of animation, according to the Cohen standard (Abu Jarad, 2013) this value falls between ($0.14 < f < 1$), meaning that the effect size of the use of animation in the academic achievement of science for third year primary students was large.

There are statistically significant differences at the level of significance ($0.05 \geq \alpha$) in the use of animation in academic achievement between students of the experimental group and students of the control group due to the method of teaching (animation). It is clear from the above that the learning strategy using animation has succeeded in raising the academic achievement of the experimental group, and this result may be due to several reasons, including:

Animation is attractive and entertaining, thus stimulating the motivation to learn, and is a way to clarify the meaning and main idea and the ease of arrival of the information to the learner (Al-Hudhali, 2015). Animation helps raise academic achievement, develop thinking skills, and cognitive skills and enhance them for learning. Animation is used in education because it simplifies the complexity and clarifies the vagueness (Al-Baqaa, 2017). Animation is considered to be a highly influential art because it offers many and unlimited possibilities, and is characterized by attractive and expressive images, and derives its characters from reality and can be deviating from the ordinary (Balousha 2013). Abdul Hamid (2013) believes that animation increases the motivation of learners and reduces time in learning and works to improve the learning process by facilitating the sensory understanding of abstract concepts.

This is consistent with the results of previous studies that showed that the experimental group achieved higher proportions using educational animation in different grades, and that animation has an effective and positive impact on students such as the Momani study (2011), the Al-Hudhali study (2015), and the study of Al-Zaq (2014), Taraf study (taraf, 2010), Awad (Wafi, 2013), Balousha (2013), Hammad (2017), Abu Sahmud (2018), Abu Al-Sheikh (2019), and there were no previous studies that contradict to the results of this study.

Recommendations

According to the previous, the study reached to recommend the following:

1. Using animation in science to increase the motivation towards learning and the acquisition of skills.
2. Teaching basic stage students using animation in science, Arabic language and Islamic education in a way that suits the growth stages of students of this age.
3. Using animation in educational fields in a studied manner.

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