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Research Article

The Effect of Reading Sequential Illustrations Drawings on Achievement Skill and Direction Reading in Book of Science for the Students of Fourth Primary Class

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Abstract

The study aims to find the effect of reading the sequential illustration in science book for the primary fifth class, the researcher used experimental procedure included: first experimental groups, It includes a group of students who study educational activities that include sequential illustrations accompanied by verbal explanations, ad the control group: It includes a group of students who study educational activities, which includes illustrations of the course, according to the usual method.

The researcher prepared measuring tools divided into three parts

1. Examination of the included shapes (collecting photos for the shape) and it consists of (8) shapes in the form of points (dotted shapes) for the student to make delusional input and connect them to reach the new bird shape.
2. The various shapes test consists of (6) different shapes of the head, trunk, neck, tail and wings, and the student must combine them together to reach the required pictorial shape that is more difficult than the first test.
3. The various shapes test consists of (10) shapes, so that the external shape is complex and inside it is a simple shape of a part of the bird (mazes). The student must visualize the shape required to reach the solution.

The results of the study confirm the following:

1. There is no statistically significant difference at a significance level (0.05) for the sequential illustrations reading processors accompanied by verbal explanation on the

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achievement of the experimental group students and the control group students that are taught according to the usual method.

2. There is no statistically significant effect at the level of a function (0.05) of the level of reading the sequential illustrations accompanied by the verbal explanation on the development of the scientific direction among the students of the experimental group and the students of the control group, which is taught according to the usual method.

Keywords: *The skill of sequential illustration drawings, achievement, direction towards illustrations drawings.*

Chapter One

First: Research Problem

The science curricula at the primary stage have witnessed several changes, which have been reflected in the school curriculum vocabulary, especially the curricula of fourth primary stage, On the other hand, these changes affected the methods and styles of teaching science, and after reviewing the science textbook for the fourth grade of primary school, I found that it contains activities (exploratory, problem-solving) and others, It also includes scientific concepts and a lot of scientific experiments that need to employ many educational media that can ensure the development of sound thinking clearly for students outside and inside the classroom [1].

The researcher believes that teaching science requires adopting various and different styles and methods according to the diversity of content, subjects and experiences.

However, the science subject does not teaching at a high level, Employment of educational skills is still poor in our schools, this led to a lack of interaction between pupils and their participation in the educational process, and thus low achievement in science subjects, which is considered as one of the most important negative indicators that directly affect achievement in science subject, from this standpoint, the researcher tries to present a research on new teaching skills for teaching science subject, It is the skill of reading sequential illustrations, because of its flexibility and redistribution of the share in a way that ensures interaction between the teacher and the student. Although many students find it difficult to read the illustrations in the science subject, Which leads to a lack of understanding and a lack of conceptual awareness among students, the method of formulating the steps of educational activities in the fourth grade science book is difficult and incomprehensible and needs the teacher's help in clarifying the illustrations and their intent, besides there is a need to prepare pupils to read illustrations, It does not grow naturally as soon as students are exposed to these

drawings. Rather, this requires guidance, and training of pupils in the skill of reading sequential illustrations.

Through that and to the best of the researcher's knowledge that there are no clear and limited strategies aimed at developing this skill in a way that is useful in knowing the scientific concepts found in the science book

And its effect on achievement and the trend towards reading sequential illustrations among pupils, by answering the following question:

1. Is there any effect of using the skill of reading the sequential illustrations accompanied by the verbal explanation on the achievement of the fourth grade pupils?
2. Is there an effect of using the skill of reading the sequential illustrations accompanied by the verbal explanation in developing the attitude of the fourth grade pupils?

Second: The Importance of Research

Illustrations diagram are one of the most important elements of textbook content in the primary stage, as they are the first thing take attention by the learner's eye. It also helps in clarifying and explaining many ideas that are difficult to express in writing.

Hensch et al. (1993) assert that science textbooks depended an explanation of a large portion of their scientific subject through non-verbal instruction.

Especially line drawings represented in illustrations, paintings, diagrams, sequential illustrations, and other styles, Since it helps the student to visualize the written text more easily [1].

Mayer and others (1995) add that the illustrations occupy a large area of the pages of school science books, ranging from a third to half the area of the pages of these books.

It helps pupils in the learning process, and teaches them how to think more clearly.

They process and organize information. The teacher relies on the illustrations in presenting the scientific subject to the students for reasons including:

1. Some students have not yet been able to read and write some scientific terms, and they can solve verbal questions, and this is due to the difficulty in reading the question or lack of understanding of some verbal words and scientific symbols [1] .
2. Illustrations are used to convey information to students in an effective and interesting way, and it performs many functions such as (approximating reality itself) to them as well as it provides them with the shape of familiar and unfamiliar things, also helps to understand things and absolute concepts [1].

It also helps the student to correctly visualize the scientific content, and it also contributes to the understanding of a lot of information, and the comprehension of complex ideas and facts that may be understood through words, and through that, the importance of illustrations can be summarized as follows:

1. It makes the book more lively: as it breaks the monotony of the written text.
2. It helps to provide the learner with experiences that help to form concepts, clear mental images, contained the features of things which symbolized by pronunciations and words.
3. Clarifies the sequence of science learning activities more easily, Where it means more than the word. It also requires dealing with it with the ability to read, interpret, analyze and be able to criticize [1].

Pupils should be trained to read drawings and illustrations without being restricted to any age. Where it must be trained in all academic levels, starting from school to university(i), and that the student must direct the perception, the visual components of the illustrations, as they must contain a sufficient number of signs that make up the subject and a number of other signs. They act as signs to direct attention and facilitate the perception process, such as using colors, arrows, lines, arranging steps, or educational procedures [2] .

More attention should be given to training learners in reading illustrations as a form of organized language, and through an intended method, and in achieving this numerous, approved, planned and systematic efforts should be made [2] .

The consecutive illustrations are useful in clarifying the steps of implementing educational scientific activities in the subject of science

By explaining each step in the drawing with a verbal explanation to verbal instructions explaining with each drawing of the steps in the implementation of the activity [2] , and as the presentation of verbal instructions has the effect of attracting students' attention to the basic educational stimuli, It is appropriate to take consideration individual differences among learners when studying the effect of different visual displays on learning [2].

The researcher believes that the use of sequential illustrations may be useful in presenting procedures for implementing the educational activity in a way that stimulate the pupils' attention, It may help in training pupils to think about reading the illustration and converting the visual shape into procedures through the use of inexpensive environmental materials. and extract information to answer a problem or implement an educational activity with different groups of students, this, in turn, is useful in meeting the cognitive style of the pupils, as each pupil has his own cognitive style, and thus some pupils may be able to read the illustrations

without the need for a verbal explanation accompanying the illustrations to respond to the content of the activity depending on the nature of the cognitive style of each class of pupils.
The researcher believes that the presence of illustrations in the textbook should be in order to achieve clear and specific aims such as presenting the content, and that such aims will not be achieved through the illustrations available, inside the textbook, unless students have the skill of being able to read these drawings, deal with them, examine and study them carefully.

Third: Aim of the Research

1. Identified the effect of using the skill of reading sequential illustrations accompanied by a verbal explanation on the achievement of primary fourth grade pupils.
2. Identified the effect of using the skill of reading consecutive illustrations accompanied by verbal explanation on the trend towards illustrations for primary fourth grade students.

Fourth: Research Limits

- Science book of fourth primary school , Print. 4, 2019.
- Students of fourth primary school, section A, B, in Al-Samaha School for male.

Fifth: Hypothesis of Research

1. There are no statistically significant differences at the level of significance (0.05) between the average scores of the pupils of the experimental group that is taught on educational activities according to the use of the skill of reading sequential illustrations accompanying the verbal explanation and the average scores of the pupils of the control group that are studied according to the educational activities that include the drawings Illustrations in the course.
2. There are no statistically significant differences at the level of significance (0.05) between the average scores of the pupils of the experimental group, which were studied according to the educational activities, the use of the skill of reading the sequential illustrations accompanying the verbal explanation, and the average scores of the pupils of the control group that is taught according to the educational activities, which include the drawings Illustrations in the course scale in the orientation toward reading illustrations.

Sixth: Define Terminology

1. Sequential Illustrations

Al-Hosary (2004): it is an expression with lines, shapes and simplified symbols. Ideas, processes, events, scientific phenomena, rules, laws, principles, relationships, structures and components of something in a brief form that facilitate and simplify the perception and understanding of these matters for the individual [2].

It is defined procedurally: they are forms that the teacher or his student already achieved or during the class to approximate the concept of the subject matter or some of its contents.

2. Read Sequential Illustrations

Mayer and others identify it (Mayer & Galini, 1990):

It is the process of translating, analyzing and interpreting all the information that illustrations can convey, and linking this information with each other to reach useful scientific conclusions [2].

Al-Hosary Identified (2004)

It is the ability to act on illustrations and their components, to recall these components and what is associated with them, and to deal with these drawings and their components as they carry meanings, ideas, relationships and problems in different visual contexts (Al-Hosary, 2004).

Procedural definition: It is a mental visual process that takes place through the pupil's acquaintance with a decree or pictorial text, scanning this text with his own eyes, translating the decree text by deciphering it, comprehending it and being able to implement what was understood in the form of observable and measurable actions.

1. Achievement

Fath Allah Defined (2006)

It is the amount that the student gets from scientific concepts when studying limited science topics, and it is measured by the achievement test prepared for that [2]

2. Allam 2006

It refers to the degree or level of success that the student attains in a general field of study or specialization[(ii)].

Procedural definition: are the grades that students obtain through an achievement test, indicating the amount of scientific facts and concepts that the pupils obtained.

The Trend towards Reading Illustrations

Identified by Fathallah (2006): The set of student responses to accept or reject and to approach or move away from reading the illustrations, and it is measured by the degree that the student gets in the dimensions of the scale [3].

Procedural definition: It is psychological tendencies towards the subject that can be known through the group of stimuli issued by the students.

Chapter Two

First: Theoretical Frame

Illustrations are considered one of the most common types of calligraphy drawings known in the educational field. It is a type of visual expression and is also called pictograms or illustrations as its closest designation, and to understand its meaning, as it focuses on simplifying ideas, main facts, and presenting the basic elements in the real form, and excluding other unimportant elements in its clarification of the idea to be expressed in a way that facilitates the process of mental perception [3] .

Illustrations are concerned with arranging relationships between all and part of facts and contributed widely in clarifying the facts, concepts, processes. The structure of things is a visual illustration, because it concerns the relationships existing between its elements or components more clearly to mental perception, than words do [3].

The illustrations are used to clarify information, deepen the learner’s understanding, communicate the learner’s understanding to others, and evaluate the learner’s understanding of the information [3].

Where it can be used to express verbal content visually, and this contributes to the formation of concepts and discrimination, and get rid of the abstraction that occurs in communication situations as a result of the use of verbal language alone.

The need is due to the importance of training in reading illustrations of educational content because it helps to understand the content and make it more complete than verbal information [3].

The development of the pupils' reading skills of illustrations needs double attention during this period due to its importance in today's world, which is witnessing a tremendous development in the field of information, its storage, retrieval, processing and transmission, as all of this is done with a large amount of visual fluids and verbal symbols [3]. Although this

importance, which the researchers emphasize on the necessity of training in the skill of reading illustrations, and increasing interest in training students to read optics as a form of organized language through an intentional method, there are no clear and specific strategies aimed at developing these skills among pupils [4].

The Chrematistics of Sequential Illustrations are:

1. They are simplified linear drawings that avoid unnecessary details found in the objects they represent.
2. They consist of lines, symbols and shapes that express what they represent, and in that they are not determined by the distinctive features of the original thing.
3. They are suitable for expressing ideas, concepts, relationships, events, phenomena, things and other things.
4. It is suitable for expressing the steps of educational activities formulated in the form of sequential drawings, as it is useful in the implementation of these educational activities.

In this research, an attempt is made to train to read illustrations by providing two levels of reading sequential illustrations aimed at translating steps of educational activities formulated in the form of sequential drawings into procedures that can be used in the interpretation of scientific concepts in the subject of science.

Read Sequential Illustrations

Reading is a key to knowledge, and the most important mechanisms that a person relies on to notice renewed ideas and information, and if the skills of reading and writing have received a great deal of attention.

Learning to read drawings and pictures needs a great deal of attention, because a large part of the burden of teaching linguistic knowledge rests with non-linguistic visual means of communication.

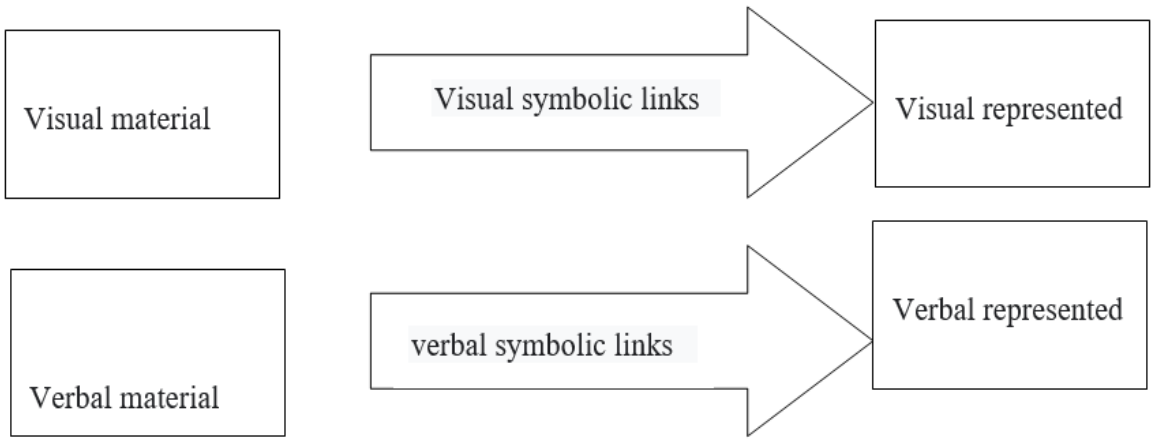
It is a process of translating, analyzing and interpreting the illustrations that leads the student to a useful scientific conclusion, and it is a complex process that includes many mental processes, i.e., decoding the message down to a meaning. The decoding process includes two important steps, which are distinction and interpretation [4].

Pavio (1991), owner of the dual-coding theory, believes that memory is divided into two types: one of them is to represent linguistic information. And the other is to represent non-verbal information, Or in other words, that a person has two memories, one visual and the

other verbal, and encoding information in the two memories leads to a better memory of them than encoding one of the two memories.

The great success achieved by visual learning methods as a means of expressing verbal information is due to the fact that a person possesses a visual memory that is stronger than his verbal memory, that is, he remembers pictures more than words, and that visual memory is more resistant to forgetting than verbal memory, so that visual information is stored in a long-term memory [4] .

Zaitoun (2005) indicates that visual and verbal imaginations occur between them, forming connections that ensure a higher retention period for information in the mind of the learner [4] .



Illustrations are considered one of the oldest visual aids for easy access, as they are economical and their display does not require devices. The Babylonians, Egyptians and ancient Greeks used them in the form of drawings and pictorial figures on rocks, animal skins and papyrus papers.

The Arab scholar Abdullah Al-Idrisi (1099-116 AD) also used illustrations as a tool to support and clarify abstract knowledge, and Comenius (1592-1670) affairmed the importance of using drawings to stabilize the perception process, and he was the first to write a book and supported it with drawings and pictures, and called him the visible world in pictures [4].

If we assume that one of the pupils read a paragraph related to the operation of the pump as a verbal representation, then asked him to read it along with providing him with an illustration showing the location of the arm and an indication of the pull and push How the pump works, thus, it will be a mental representation of the pump, and in order for this mental representation to be formed for the student, it is necessary to form three connections, which are as follows:

1. The learner receives the educational material presented visually, then builds a verbal representation for it and thus it will be stored in the learner's memory and information such as when the arm is raised the valve is open.
2. The learner receives the presented material visually, thus building a visual representation of it and it is called a visual report correlation, for example when the arm is raised and the valve turns into a closed position.
3. The learner builds semantic connections between visual and verbal representations, such as if the pressure on the valve is reduced, the volume will increase, and then the visual representation provides a verbal description. Therefore, the visual representation is a verbal representation through interconnections and the connotation between them and this contributes to building the mental model and thus becomes able to solve the problems that require calling that mental model [4].

Farag (2012) refers the importance of drawings in their role in achieving a complete understanding of a certain thing that depends on visual experience, without which it is impossible to form a perceptual scheme [4].

On this basis, various studies have been conducted in the field of using drawings and images within the framework of educational technology. In this field, the study of Madarsh (1986), which aimed to identify the factors affecting the levels of interpretation, revealed visual symbols.

Such as the effect of illustrations on good learning and the study of Khamis (1993), which aimed to identify the availability of three levels of reading a photographic image, namely (recognition - description - interpretation) among a sample of students ranging in age from (4-10) years from different environments.

In addition to identifying the factors affecting the levels of image reading among pupils, and as Shaaban (1997) conducted a study aimed at identifying the effect of a unit on visual culture on the skills of dealing with images and drawings of fifth grade pupils and the achievement in science subject. It was found from the results of this study that the drawings Illustrations and photos have the effect of changing behavior towards a more learned response [4].

Some educators consider the necessity of training in the skill of reading drawings and illustrations, and training in the skill of reading is necessary as an educational method in the teaching and learning process, especially those that are difficult to understand verbally, including:

First: Training in the Skill of Direct Reading of Illustrations

Direct training is based on the skill of reading sequential illustrations and allowing pupils to present speculations and extract correlations between the things that are observed, meaning that the notes actually impose previous perceptions inspired by previous observations or from initial perceptions, and training in reading drawings is done through the following four skills:

1. Translating the illustration: by translating the illustration, it means knowing what a line, symbol, or number written on the illustration means, and this skill includes the following:
    a. Know the components of the illustration, the sequence of these components, and the relationship between them.
    b. Help pupils describe the illustration in verbal words.
2. Analysis of the illustration: The analysis of the illustration means the ability to perceive the relationships between the procedures described therein, and this skill includes the following:
    a. Clarify the relationships between the procedures.
    b. Determine the sequence of actions shown on the drawing, and the requirements for each procedure .
3. Interpretation of the illustration: The interpretation of the illustration is intended to give a reason for the sequence of illustrations, as well as the relationships between the procedures illustrated by the drawings, and this means understanding the connection or the reason for the existence of a phenomenon, with the drawings on which it is found, in away that the studying the causes affecting the scientific phenomenon in the way it is on it. In the illustrations alone, therefore, the interpretation of illustrations requires a scientific background in order to be able to explain the occurrence of scientific phenomena on its basis. The skill of interpretation includes the following:
    a. Interpretation of the sequence of actions as shown on the drawing.
    b. Interpret the relationships between actions as in the illustration.
4. Conclusion from the illustration: the conclusion from the illustration is intended to come up with some results, instructions, or concepts from the drawing, whether the conclusion is for actual phenomena or future conclusions, and the skill of helping students to deduce from the illustrations includes the following performances:
    a. Deduce some concepts such as (electrical circuit, magnetism, buoyancy, combustion, electric current ... etc).

b. Expect certain changes to occur as a result of performing the procedures shown in the illustrations [4].

Second: A Model for Teaching Reading Illustrations as a Type of Procedural Knowledge

Gagnier (2000) notes that training in reading illustrations is based on training in how to learn procedural knowledge (that, it requires from the student to perform a specific action, or an act such as writing a report, analyzing a text, reading an illustration, or an educational picture) [4].

In light of this, Lowe (1993) proposes a model for teaching reading illustrations as a type of procedural knowledge, as he asserts that reading illustrations is not limited to knowing the form, but also includes reading them in terms of their content, reading meanings, and the ideas that these drawings carry and it includes It has three main steps:

The first step: Building ideas: It is a process through which students are provided with the requirements for building an initial idea of the illustration by providing students with convictions of the need to use illustrations, and implementing this step-by-step with an audible voice expressing the idea, tactic or strategy, so that students get to know the steps, Or the processes and knowledge included in the illustration. Also, each learner describes the elements of some illustrations and specifies their components in detail.

The Second Step: Formation of procedural knowledge (Recruiting of skills or processes): Where students at this stage modify the initial idea of the skill or process, which was acquired from reading drawing by linking the elements of the visual stimulus to each other, and trying to make assumptions about the meanings that can be used when installing these elements together in an integrated whole, during this stage, mistakes occur, and the learner here may need al (conceptual) understanding of the skill, give illustrative examples, and allow the opportunity to ask questions and answer them, as the process of forming procedural knowledge is the most important part in developing procedural expertise for reading drawings Illustrative.

The third step: concentrating procedural knowledge (knowledge integration): It is intended to integrate knowledge and practice it in the form of procedures until a point is reached through which the learner can perform them with relative ease. At this stage, the

student provides the necessary explanations for his assumptions and assumptions about the meaning extracted from the visual stimulus, and arrives at a reading related to extracting the meaning carried by the message of the visual stimulus, and related concepts.

In another study (Levie & Lentz (1982), the use of diagrams and illustrations, in addition to explanation and clarification in the text gave good results in learning: as for content with diagrams and illustrations without verbal explanation, it did not give positive results [4].

In Bernard's study (1990), a comparison was made between presenting a schematic figure only and presenting a schematic figure with some directions or instructions that show how to best deal with the shape and providing a schematic figure with a text explaining the most important points contained in the abbreviated form that helps in the process of examining the shape. The study proved that the schematic shape associated with both types has a positive effect on both memory and understanding more than the shape alone [4].

The results of Fouda's study (1991) confirm the effectiveness of illustrations in developing cognitive achievement in the subject of science, and the thinking and learning patterns of primary school pupils [4].

Second: Previous Studies

Abidi's Study (2018): The effect of using an educational program based on animated learning activities on achievement and trends towards science among fifth grade students in Jenin governorate.

Summary

The study aimed to identify the effect of an educational program based on animated learning activities on achievement and trends towards science among fifth grade students in Jenin Governorate in the first term of the academic year (2017/2018).

The study used the semi-experimental approach, and the study tools were applied on a sample of 71 students from the fifth grade in the Palestinian-Korean Friendship School of the Education Directorate in Jenin.

Where the students of the study sample studied the unit (energy) in the general science book for the fifth grade basic two groups (experimental and control), and in order to achieve the objectives of the study, an achievement test was prepared consisting of (30) items, and the teacher's guide, In addition, the trends scale were prepared, which consisted of (43) items. The results showed the superiority of the experimental group in the achievement test over the

control group, and the study indicated that there is an interaction between students ’achievement and the trend towards science. In light of the results, the study recommended the use of learning activities with animation in science teaching because of their importance in increasing achievement and orientation towards students [4].

Fathallah Study (2006): The effect of the interaction between reading illustrations and cognitive style on achievement and the trend towards reading illustrations in the science book.

Study Summary: The study aimed to identify the extent of the interaction between two levels of reading consecutive illustrations and the cognitive style on the achievement and direction of students and reading the illustrations in the science textbook in the fifth grade of primary school in the Arab Republic of Egypt.

The study used the experimental approach based on designing experimental tribal treatments through the following groups:

- The first experimental group / includes a group of pupils and students who study according to the educational activities that include consecutive illustrations without verbal explanation.
- The second experimental group / includes a group of male and female students who study according to the educational activities that include illustrations accompanied by verbal explanations.
- The experimental control group / includes a group of students who study according to the educational activities that include illustrations in the course of study, and teaching in the usual way.

The research experiment was implemented during the second term of the 2018/2019. The results of the study confirm the following:

1. There is a statistically significant effect at the level (0.05) of the treatment of reading the sequential illustrations used in this study on the achievement of the fifth grade pupils in scientific concepts.
2. There is a statistically significant interaction at the level (0.05) between the treatments and cognitive methods in the achievement of the fifth grade pupils in scientific concepts.

3. There is a statistically significant effect at the level of significance (0.05) for the level of reading the illustrations used in the study on developing the attitudes of pupils in the fifth grade of elementary school towards reading the illustrations.
4. There is a statistically significant effect at the level (0.05) of the cognitive style on developing the attitudes of the fifth grade pupils towards reading illustrations.
5. There is no statistically significant interaction at the level of (0.05) between the level of reading the illustrations and the cognitive style of the fifth grade pupils [4].

Chapter Three

Research Procedures

In this chapter, the researcher presented the procedures which are used in investigate the aim of the research in order to Validation of hypotheses:

First: Experimental design: The experimental design means setting up a plan of action with specific aspects that helps the researcher in testing his hypotheses accurately.

It also represents the basic structure of the experiment that leads to the experimental foundations that determine the dimensions of the experiment and reflect the effects of the (independent and fixed) variables after determined other extraneous and interfering variables that enter the field of experimentation [4].

The researcher has adopted the experimental design with two groups (experimental and control) and those with a post-test, one of them adjusts the other partially because it is suitable to achieve the aim of the research. As in scheme (1) which illustrates the experimental design of the research sample:

Table 1.

Experimental Design for the Research Sample

Seq.	group	Independent variable	Dependent variable	Tool
1	experiment	The skill of reading sequential illustrations diagram accompanied by verbal explanation	1- Achievement 2- Direction towards pictograms	Post test
2	control	The standard method for using pictograms in a Curriculum		

Second The Society of the Research and its Sample:

The researcher chose a sample of fourth grade students from Al Samaha Primary School for Boys, for the reasons:

The school contains (2) sections from the fourth grade of primary school, and this is consistent with the research requirements and gives freedom of random choice in the distribution of people into two control and experimental groups. Where section (A) contained (33) students, which is the experimental group and the second (B), which consisted of (33) students of the control group, as shown in Table (2):

Table 2.

The number of research sample in two groups experimental and control

groups	section	No. of students	The number failed students failed	The Number of exclusion students
Experiment	A	33	2	31
control	B	33	2	31
Total	2	66	4	62

Third: The Equivalent of the Two Research Groups

The process of achieving equivalent between the two research groups is extremely important, The researcher should at least try to form equivalent groups with regard to the variables related to the research [4].

Therefore, the researcher was keen, before starting the experiment, on the statistically equivalence of the pupils in the two groups of research in a number of independent variables that he thought might affect the dependent variables, namely (intelligence, testing of previous information, previous achievement in science for the third grade of primary school).

IQ Test

Intelligence means an experience obtained with the help of the senses and a final outcome of the system of physical factors and the environment in which learning processes and results are carried out, as it is associated with performance methods such as speed of understanding, inference, accuracy of performance and awareness of relationships. The researcher applied the Raven Intelligence Scale, which consists of (20) items.

The arithmetic mean of the experimental group was (27.29), the variance was 4.78, while the arithmetic mean of the control group was (27.03) and the variance was 4.57. And with a degree of freedom of 60, which indicates that the two samples are equivalent in the IQ test, as in Table (2).

Table 2.

The equivalent of two groups of research in the intelligence variable

Group	No. of students	The Arithmetic mean	variance	Degree of freedom	(t) Value		Statistical significance at the level 0.05
Experiment	31	27.29	4.78		accounted	Tabular	Is not a statistically significant function
Control	31	27.03	4.57	60	0.465	2.00	

Test the Previous İnformation

A test was prepared by choosing the first unit, which consists of (Chapter 1 / Lesson 1 and 2) and (Chapter 2 / Lesson 1 and 2) and consists of (20) test items of the multiple test type. It was presented to a group of experts and referees, as the arithmetic mean of the experimental group was (7.58) and the variance (1.62), while the arithmetic mean of the control group was (8.27) and the variance (2.02). 1.98), It is less than the tabular (2.00) at the level (0.05) and the degree of freedom (60), which indicates that the experimental and control samples are equivalent in this variable, as shown in Table (3):

Table 3.

The equivalent of two groups research in variable of previous information

Group	No. of students	The Arithmetic mean	variance	Degree of freedom	(t) Value		Statistical significance at the level 0.05
Experiment	31	7.58	1.62		accounted	Tabular	Is not a statistically significant function
Control	31	8.27	2.02	60	1.98	2.00	

Previous Achievement in Science for the Third Grade of Primary School

The researcher adopted the experimental and control groups in the previous achievement variable in the science subject of the third primary school. Where the arithmetic mean of the experimental group reached (53.94), the variance (19.16), the arithmetic mean of the control group (57.24) and the variance (15.64). Freedom (60), which indicates that the two groups are equal in the previous achievement variable. as in Table 4:

Table 4.

The equivalence of two groups in variable of previous achievement

Group	No. of students	The Arithmetic mean	variance	Degree of freedom	(t) Value		Statistical significance at the level 0.05
Experiment	31	53.94	19.16		accounted	Tabular	Is not a statistically significant function
Control	31	57.20	15.64	60	10.26	2.00	

Research Requirements

a. Determine the Scientific Subject

The first unit of the science book for the fourth grade of primary school

(Unit One / Classification and Diversity in Living Organisms)

Chapter one / Simple Living organisms

Lesson 1 / Bacteria: Their Structure and Characteristics

Lesson two / algae composition and Characteristics

Chapter two/ compound organisms

Lesson 1 / compound Plants.

Lesson two / compound animals.

The scientific subject is summarized as follows:

First: The basic concepts that represent one of the pillars of the cognitive construction of the teacher, and some previous studies indicate that students have alternative perceptions about these concepts.

Second: Many scientific experiments and activities that students can do through the use of illustrations.

Third: Teaching the concepts is appropriate (12) lessons, which gives students the opportunity to train in reading illustrations and forming an orientation towards them.

Fourth: The primary school teachers have difficulty in teaching some concepts, and some teachers even have alternative perceptions of some concepts.

a. Determined educational aims: The educational objectives of the research can be summarized in:
    1. Providing students with the scientific concepts related to the science subject / first unit (the first term, the lessons 1 and 2 / the second, the lessons 1 and 2).

2. Giving students a positive attitude towards reading illustrations in the science book.

b. Preparing the educational material in the form of worksheets:

The educational material for the study was formed in the form of working papers, where the theoretical framework and the results of previous studies and research were used.

The worksheets have been formulated so that each paper includes one educational activity, which is based on reading the illustrations and takes advantage of the information available in the drawing to implement the educational activity and proceeds according to the following steps:

First: Defining the aim of the educational activity.

Second: Presenting the activity in the form of an exciting and confusing problem for students, by formulating the problem in the form of a question followed by three answers near to the right, but of the three answers, only one answer is correct.

Third: Directing each student to answer the question by specifying only one answer to the question and with specifying the justification for choosing this answer, and writing that in the worksheet (activity).

Fourth: Directing each student to familiarize himself with the tools that he will use in the implementation of the activity, and to read the steps for practically implementing the activity by using the skill of reading the sequential illustrations accompanied by the verbal explanation.

Fifth: Directing the student to implement the activity by following the steps that have been read by using the skill of reading illustrations, where the activity is carried out through simple environmental materials available in the environment.

Sixth: Directing the student to write or record his findings in his own way, by answering the problem again. In the light of his findings and observed by himself.

Seventh: Discussing the results of the activity: By asking a question to the student, were the results consistent with the first answer (yes / no), the student writes a justification (reason), whatever the answer (yes first).

Fourth: The Two Search Tools

An achievement test and a measure of trend towards sequential illustrations were prepared.

a. Achievement test.
b. A trend scale towards illustrations.

1. Building the Achievement Test: An achievement test consisting of (20) items of the multiple choice type was prepared, and then presented to a group of judging experts.

Fifth: The validity of the test: It was found that there is a correlation of (0.76) between the test and the test results for the drawing of the pupil, and it is also used in the degree of differentiation of the perception of the body. The distinction for this test was proven through a high and clear distinction between the drawing and the results.

The validity was calculated and the consistency factor of the test items with the total score of the test scores at a significance level of 0.05 was (0.76).

Sixth: Stability of the test: The value of the parameter was calculated using the Alpha Krumbach equation, and it reached (0.76).

Scale of the Trend towards Reading Sequential Illustrations: The aim of the scale: A measure of the attitude of pupils in the fourth grade towards reading the illustrations in the following dimensions:

a. Enjoy reading illustrations.
b. Organizing the content of the illustrations.
c. Pay attention to reading the illustrations.
d. Output the illustrations.
e. The value of reading illustrations.

Studies and researches that dealt with how to construct measures of trends towards educational materials have been reviewed, including Abdel Moneim and Hassan (1985), Dwyer & Moore, (1994) and Abdel Nabi, (1995).

2. Formulation of scale phrases: The scale statements were placed in a dialectical form around which views differ, so that about half of them are positive and the other half negative, with a revealing statement to verify the seriousness of the answer.

The scale included the scores for the answer as follows (agree, unsure, disagree).

3. Validity of the scale: The scale was presented to a number of referees specialized in teaching methods, evaluation, measurement and psychology to verify its validity, and the extent to which the statements represent the sub-dimensions that make up the scale, and the scale was modified in light of the observations of the judging experts.
4. Exploratory experimentation of the scale: The scale was experimentally tested on a sample of fourth-grade students of (50) students in Al-Nasr Primary School belong to the Baghdad Education Directorate / Rusafa II, and the reliability coefficient was

calculated using the Alpha Crombach equation and its value was (0.82), which indicates It is valid for study purposes.

5. Scale time: The performance time was calculated on the trend scale towards the illustrations and reached (30) minutes.

Table 5

	Scale dimension	Positive phrases	Negative phrases	Total no. of phrases	Percentage weight
1	A- Enjoy reading illustrations.	**1,6,11**	**18, 23**	**5**	**20%**
2	B- Organizing the content of the illustrations.	**16,17**	**5, 22**	**4**	**16%**
3	C- Pay attention to reading the illustrations.	**14,15,20**	**4, 9, 21**	**6**	**24%**
4	D- Output the illustrations.	**3,13**	**8,9,24**	**5**	**20%**
5	E- The value of reading illustrations.	**12**	**13**	**25**	**20%**
6	Total examples	**12**	**13**	**25**	**100%**

Third: Implementation of the Study Experience: The study experiment was implemented during the first term of the academic year 2018/2019, and it took (15) weeks.

1. Pre-Application of the study tools: The study tools were applied before experimenting on the study sample during the first week of the term of the academic year 2018/2019, where an achievement test and an attitude scale towards reading illustrations were applied in order to identify the amount of information they possessed and trends towards reading the illustrations.
2. Training the existing teacher for the teaching of the experimental group

The existing science teacher was trained by training the subject for the experimental group, and the teaching steps were explained,

It is based on presenting working papers on educational activities that can be carried out by using the skill of reading sequential illustrations and by using available and cheap environment materials accompanied by verbal explanation.

3. Teaching the study group: The teacher who explains the subject was given a teacher's guide to guide him during the teaching as in the following steps:
    a. Organizing the class time according to the activities and the teaching stages.
    b. Emphasis on reading the illustrations while performing the educational activity procedures.
    c. Using cheap material and available in environment.

d. Encouraging discussion and participation among pupils.

As for the control group, the teacher studied them using educational activities that include illustrations in the study course.

1. The Application of the study tools in a dimension: After completing the experiment, the achievement test was applied, and the trend measure towards reading the illustrations on each of the experimental and control study groups, and then analyzing the data statistically on 12/18/2019.

Seventh: The used of statistical methods: The researcher analyzed the data by using the statistical packages program (SPSS) to calculate averages and standard deviations, and analyze the variance.

Chapter Four

Presentation and Interpretation of Results

First: Result Presentation

There were no statistically significant differences at the level of (0.05) between the mean scores of the first experimental group Which studies educational activities by using the skill of reading sequential illustrations with verbal explanation and the level of degrees of the control group that is taught according to the educational activities, which include illustrations in the course of achievement.

Table 6.

It shows the significance of the differences between the mean scores of the experimental group and control subjects in the achievement

Group	No. of students	Arithmetic mean	variance	The computed t value	The tabular t value
Experimental	31	80.066	160.26	2.33	2
control	31	72	199.53		

The Arithmetic mean of the experimental group reached (80.066), with a variation of (160.26), while the average scores of the control group reached (72), with a variation of (199.53). By using the test (t-test), it became clear that the difference between them was statistically significant at a level of significance (0.05), as the next computed value reached (2.33), which is greater than the tabular value (2) at a degree of freedom (60), where there is a statistically significant difference between the mean scores of the experimental and control group students in the level of achievement.

The researcher calculated the size of the effect of the independent variable the skill of reading sequential illustrations with verbal explanation) in the dependent variable (achievement) By using the effect size equation, it measures the level of correlation between the independent and dependent variable, and as shown in Table (7)

Table 7.

The value of (t) and (η^2) and the size of the effect

The tabular t value	The computed t value	η^2 *value*	*Effect velum*
2	*2.23*	*0.169*	*Large*

And to verify the null hypothesis, which stated that there are no statistically significant differences at the level of significance (0.05) between the experimental group that studies educational activities, by using the skill of reading the Sequential illustrations accompanying the verbal explanation and average marks of the control group students studying educational activities, That includes course of study in the In scale the trend towards reading illustrations As we shown in table (8).

Table 8.

It shows the significance of the difference between the mean scores of the experimental and control groups in the trend scale

Group	No. of students	The Arithmetic mean	Variance	The computed t value	The tabular t value
Experimental	31	18.133	9.25	3.85	2
Control	31	14.33	15.56		

The average score of the experimental group students reached (18.133) and a degree of variance of (9.25), while the average scores of the control group students reached (14.33) with a variance of (15.56), at the level of significance (0.05), as the second calculated value was (3.85), which is greater than the second tabular value (2) with a degree of freedom (60).

Where it was found that the performance of the pupils of the experimental group, which studied educational activities using the skill of reading accompanying illustrations with verbal explanation, outperformed the students of the control group that studied the educational activities, which includes course of study in the on Reading Illustrations scale. To

calculate the size of the effect of using the skill of reading the illustrations in measuring the trend towards reading the illustrations using the square (η^2) and as shown in the table (9):

Table 9.

The value of (t) and (η^2) and the size of the effect

The tabular t value	The computed t value	η^2 *value*	*Effect velum*
2.002	*4.22*	*0.234*	*Large*

Second: Result's Interpretation

The results of the study indicate the superiority of the pupils of the experimental group that studies the educational activities using the skill of reading the illustrations accompanying with the verbal explanation over the students of the control group that studies the educational activities that include the illustrations in the course.

As this strategy contributed to improving the level of achievement through the use of the skill of reading the illustrations accompanying the verbal explanation, their skill improved regularly and sequentially, and knowledge was entrenched in the minds of the students, and it became part of their personality, and the pupils discovered and read the drawings themselves, with high skill and a desire to learn, and to further encourage students to set aims and the ability to organize knowledge of various activities and apply this knowledge in new situations and increase clearly the level of thinking and awareness of educational situations. Which shows the effectiveness of teaching through the use of the skill of reading sequential illustrations accompanied by verbal explanation to the experimental group students on the level of achievement and their superiority over the control group students.

It was also found that the pupils of the experimental group, which studied using the skill of reading sequential illustrations accompanied by verbal explanation, in the direction of reading the illustrations, may outperform the students of the control group that studied educational activities that include illustrations in the course in the direction towards reading the illustrations. Therefore, the shapes in the illustrations allow pupils to visualize the materials to be used to implement the activity and to achieve learning.

The reason for the superiority of the experimental group pupils over the control group is that the primary school students are able to classify and arrange things through internal mental processes, and they have a cognitive level that enables them to perceive the relationship between two things in the educational subject whenever this helps to attract the attention of students and direct them so that they can quickly determine the thing they want to learn.

In addition to increasing the achievement to a better degree from the control group students, for which less stimuli were presented, only the activities that included in the studding course. Also, communication through multiple channels linking words with illustrations increases learning due to the collection of hints between channels.

As it requires students to make mental processes such as (observation, comparison, perception between relationships, conclusion). Whereas, the verbal explanation accompanying the illustrations helped pupils in process the information in more depth.

As for the results related to the answer to the following question, which states the extent to which my treatment affects reading the sequential illustrations with verbal explanations for the control group students, which were studied according to the traditional method.

In the trend towards illustrations for pupils towards reading illustrations in the science textbook for fourth grade of primary school, this may be due to the fact that using the skill of reading illustrations helped pupils in carrying out educational activities, and to answer these questions. This is what helped pupils to gain a kind of reward, which may contribute to the formation of an attitude towards reading consecutive illustrations by reducing the dissonance between the various elements related to the subject of the trend towards illustrations in the science book. For example, students were provided - through their teachers, with information about the advantages of these illustrations and their importance to them, and encouraged to read them.

These sequential illustrations have changed in achieving the utilitarian function of pupils, and this in turn is a positive trend towards reading illustrations. Pupils' knowledge of the purpose of reading illustrations and their sense of utilitarian value can change their attitudes and form positive attitudes towards reading them.

The superiority of the experimental group over the control may be due to factors that affect the trend towards reading illustrations, such as the verbal explanation and the size of the stimulus, and the method of the illustrations are organized, the method they are presented, and the level of maturity of the pupils, as it greatly affects the formation of the students ’attitude towards the illustrations.

Recommendations

1. Training science teachers at the primary stage to use illustrations and teach pupils how to read them and make use of their information in implementing educational activities in the science subject.
2. Urging the authors of science books to use sequential illustrations in presenting science subjects in general and presenting educational activities in particular, given that pupils in the primary stage are still in the stage of sensory processes through which different concepts are perceived and intellectual processes are produced through real events and sensory experiences of things.
3. Directing the attention of science teachers in the primary stage to the individual differences in the cognitive styles of students in the primary stage and taking this into account when teaching and dealing with scientific activities.
4. Presenting the sequential illustrations accompanied by the verbal explanation to the students, which affect their mental perceptions properly.
5. Presenting other studies, such as displaying illustrations in a horizontal or vertical manner, according to the stages of the sequence.

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