

## **The impact of the Barman model in the achievement of students of the Department of Science - College of Basic Education in the subject of visual**

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### **Abstract**

The aim of the current research is to identify the impact of the Barman model on the achievement of students of the Department of Science - College of Basic Education in the visual subject. The researcher adopted the experimental design with partial control for the experimental and control groups in the post test of achievement. The research community was limited to all students of the second stage / Department of Science / Physics Branch / of the faculties of basic education in Iraq for the academic year (2020-2021), and the sample of the current research was chosen randomly, and the number of its members was (45) male and female students, and by (22) male and female students who studied according to the Barman model (the experimental group), and by (23) male and female students who studied according to the usual method (the control group). The experimental and control groups were equalized in the variables (intelligence, pre-visual information, and previous achievement of general physics degrees for the academic year (2019-2020) ). After defining the scientific material for the practical visual subject, the researcher formulated behavioral objectives, and their number was (142) behavioral objectives. As for the research tools, the researcher used the academic achievement test for the practical visual material, which in its final form consisted of (40) objective items of the type of multiple choice. The experiment started on Tuesday, May 25, 2021, on the two research groups (experimental and control), and the experiment ended on Tuesday, July 25, 2021, meaning that it took a full semester (9 weeks) and one lecture per week for each of the experimental and control groups. The researcher adopted the Statistical Package Program (SPSS) to process the research data and information, and in light of this, the results of the existence of a statistically significant difference in favor of the experimental group appeared in the achievement test.

### **Chapter One: Introduction to the Research**

#### **❖ Research Problem**

We seek in teaching physics in the different educational stages to prepare students for life and keep them up to date with the spirit of the age by developing their mental abilities represented in thinking in its different styles, especially advanced ones, which is due to the acquisition of scientific knowledge and increasing its attainment in the mind of the learner, which can lead to the generation of new physical knowledge that enables students to discover and follow what is recent, despite the clarity of that vision and as a primary goal in teaching physics, which has increased in importance in our time, especially in optics, it has not kept pace with the changes that this world is witnessing from the use of modern methods and strategies with the latest technologies in teaching physics, the researcher found that the problem still

## The impact of the Barman model in the achievement of students of the Department of Science - College of Basic Education in the subject of visual

exists and that there is a shortcoming in teaching that does not address the weakness in teaching, so it is necessary to think seriously about solving this problem and finding the appropriate solution to address it and searching for appropriate modern teaching methods and strategies, in order to motivate teachers to use new methods in teaching physics , therefore, it was necessary to think of strategies, methods that are better than the traditional methods and these strategies are associated with the educational system within the educational institution to contribute to facilitating the process of learning and teaching according to the foundations through which the goals of education, in the light of which that system is going, are achieved.

Therefore, the current research is an empirical attempt to prove the impact of the Barman model on the achievement of students of the Department of Science - College of Basic Education in the subject of visual.

### ❖ **Research Importance**

The importance of the current research can be summarized in the following points:

1. It is the first study within the limits of the researcher's knowledge that deals with the relationship between the Barman model and achievement in visual material.
2. The importance of using modern models in education, as it represents a new attempt to keep pace with recent in-depth studies of the practical aspects of second-grade physics students.
3. Its importance in knowing the impact of the Barman model on the achievement of the second students of Physics - Department of Science.
4. The importance of the visual laboratory material in developing the learner's practical skills and his ability to work in the laboratory.
5. The importance of the university stage as it is the stage in which learners reach an advanced degree of mental maturity.

### ❖ **Research Objective:** The current research aims to identify:

The impact of the Barman model on the achievement of students of the Department of Science - College of Basic Education in the visual subject. The goal of the research can only be achieved through the research hypothesis:

- 1- There is no statistically significant difference at the level (0.05) between the average scores of the experimental group students who study according to the Barman model and the average scores of the control group students who are according to the usual method of achievement.

### ❖ **Research limits**

- Spatial limits: Al-Mustansiriya University - College of Basic Education.
- Human limits: a sample of second grade students in Physics - Department of Science.
- Scientific limits: A Guide to Visual Laboratory Subjects.
- Time limits: the second semester of the academic year (2020-2021).

❖ **Define terms**

- Barman model: an educational model based on constructivist learning, and it consists of four phases that confirm the students' tribal knowledge as a phase that precedes the investigation, and the phases are: (identification or guesswork, investigation, dialogue, and application)" (Zayer et al., 2014: 292).
- Achievement: Najjar (1960) defined it as the completion of a work, and the achievement of excellence in a skill, or in a set of information (Al-Saadi, 2021: 17).

**Chapter Two \ Aspects of the theory**

**The first axis:**

• **Barman Model**

One of the important models that was characterized by the nature of modernity and interest in studies and research related to the mental development of the learner, which emerged in particular from the cognitive perspective of the world (Jean Piaget) is a model launched by (Charles Barman in 1990) based on what was done by contemporary psychologists and educators with his perceptions New concepts and mental processes that must be acquired by students at different levels of study and of different ages, as well as based on the large number of educational programs that were designed, prepared and implemented based on a special perspective (Piaget Committees), and he called it the supracognitive learning course, in which Barman combined uses and models above and between the principles and basics of Piaget's theory, and this model included a number of developments until it reached the so-called (the supracognitive learning course), so Barman revised the developed learning course and presented it in the form of his own model called the Barman model, therefore, Barman suggested that the normal learning course does not contain a specific method for showing prior knowledge, so Barman's model does not differ from the learning course except that teachers determine learners' perceptions of clear scientific concepts before the beginning of the lesson, and this modification Barman added is an element (prediction or guesswork) or the use of prediction sheets for learners so that their scientific ideas become clear, the supracognitive learning course appeared after the Barman course to embody the entrance to the four phases of Barman, with the addition of asking the learner to show his thinking seriously. (Faleh, 2017: 37).

**Advantages of the Barman model:** The Barman model consists of several advantages, including:

1. Emphasizes the active role of students.
2. It helps students to understand new scientific ideas.
3. Develop sound scientific concepts for students.
4. Defines the misconceptions of students and attempts to address them.
5. Knowledge is temporary and is tested on an ongoing basis, and it is judged by standards.

(Yager, Robert, 1991: 140).

**Postulates of the Barman model:**

- 1- Building information is better than presenting it ready-made.
- 2- The information of the group is greater than the sum of the information of each individual person.
- 3- Learning should be positive and not negative on the part of the student. (Smerdon. R. E & Burkam 1999, p. 140)

**The phases of the Barman model:** This model consists of four phases, but it differs from the previous Barman model (Barman, 1989) in its emphasis on the tribal knowledge of students as a phase that precedes the investigation.

- 1- **Assessment phase:** the teacher uses methods to help students determine their knowledge about the topic of the lesson, and this phase helps them communicate to the correct understanding of the concepts of the lesson. (Zayer et al., 2017: 70).
- 2- **Investigative Phase:** This phase gives students a common base of experiences through which concepts, processes and skills are identified and developed. It prepares the ground for students' activities and their questions related to the topic of the lesson, as the teacher equips the learners with the materials and tools necessary for the process of investigation or exploration, and asks them to carry out the process of investigation and ask questions, the activities of this phase may lead to more curiosity of students and generate new questions and during this process of questioning and exploration, students begin to formulate their understanding of the basic concepts, the teacher can also present a scientific presentation of the topic of the lesson. (Al-Afoon and Makawun, 2012: 120) The role of the teacher at this phase is that a guide for students while they practice classroom activities and encourage them to continue thinking to find appropriate solutions to solve the problems presented to them. (Al-Tamimi and Rasha, 2015: 70).
- 3- **Dialogue Phase:** In this phase, the concepts of the lesson are clarified through class discussion between the teacher and students, as the investigative experience becomes the basis for developing a scientific formulation of the concept, and the role of the teacher is essential in this phase because he works to discuss the learners about the information they have reached. (Zayer et al., 2014: 39).
- 4- **Application Phase:** Students compete to provide multiple examples of the concept, apply the information obtained in the previous phases, to a cognitive transfer to a new task, and to a new learning course, this helps them to organize their ideas and link them to the concept that has been learned, and the evaluation takes place in all phases of the educational course. (Saidi and Al Balushi, 2009: 241).

### **The second axis / previous studies dealing with the Barman model**

**Faleh's study (2017)** (The impact of the Barman model on the achievement of chemistry and convergent thinking among fifth-grade science students).

The study aimed to know the impact of the Barman model on the achievement of chemistry and convergent thinking among fifth-grade students, where the researcher relied on the experimental method in his research based on the design of two experimental and control groups, the study was conducted in Iraq at the University of Baghdad, College of Education for Pure Sciences / Ibn Al-Haytham, and the sample consisted of (61) students, (31) students for the experimental group that studies chemistry using the Barman model, and (30) students for the control group that studies the same subject in the traditional way, the duration of the experiment was (8 weeks), as for the test tools, two tools were used: the convergent thinking test and the achievement test, and the researcher used the statistical means (SPSS). The results showed the superiority of the students of the experimental group who study chemistry with

the Barman model over the students of the control group who study the same material in the traditional way in the convergent thinking test.

### Chapter Three: Research Methodology and Tools

#### ❖ Methodology of Research

The researcher adopted the experimental approach as the appropriate approach to the nature and objectives of the research. It is an approach that deals with those researches that verify information, hypotheses and predictions of scientists, and it is one of the most scientific approaches that clearly show the features of the scientific method (Al-Abadi, 67-82: 2015).

#### ❖ Experimental Design

The choice of the experimental design of the research is one of the most accurate tasks that fall on the shoulders of the researcher, as he is a plan or a work program for how to implement the experiment (Abd al-Rahman and Adnan, 2007: 487).

The researcher chose to design the two experimental and control groups, one of which controls the other partially and with the post-test in achievement, and the design requires the presence of two groups, one of them is an experimental group that is taught according to the Barman model, and the other is a control group that is taught according to the usual method as in the following scheme:

Scheme (1) represents the experimental design

the group	Parity	Independent variable	Dependent variables
Experimental	Previous information	Barman model	Achievement
Control	Previous collection Intelligence	Usual way	

#### ❖ Research community and sample

##### ❖ Research community

The current research community was determined by all the students of the second stage / Department of Science / Physics Branch / College of Basic Education / Al-Mustansiriya University, and Mosul University for the academic year (2020-2021) of (181) male and female students and distributors, respectively (91,90).

##### ❖ Research Sample

The researcher selected the sample by random selection, the experimental and control groups, as hall (1) was chosen to represent the research sample and was divided into two groups, the experimental group (A) that studies practical visual material according to the Barman model, and the group (B) represents the control group that is studying the same subject according to the usual method, and the number of students in the experimental group was (22), and the number of the control group was (23), and all students of the

second stage were retained because there was no failure in the two groups (experimental and control), and the research sample became composed of (45) male and female students.

#### ❖ **Research Groups Equitation**

(Obaidat et al., 1992) believes that the dependent variable is affected by the characteristics of the individuals of the research sample, so the research must be conducted for equal groups so that there are no differences between the members of the experimental and control groups except for the entry of the experimental variable to the experimental and control groups (Obeidat et al., 1992: 246-). To make sure that the two groups (experimental and control) were equal, the researcher conducted an equivalency in some variables related to the current study, namely (intelligence, previous achievement and previous information).

#### ❖ **Control Of The Internal Variables**

The extraneous variables are those that affect the dependent variables. There are two types of variables that threaten the first validity that threatens the internal validity, which is the minimum and the basis without which no results can be explained, as for the external validity, it is related to the issue of generalizing the results (Al-Bayati and Khalifa, 2015: 214). The researcher tried to limit the impact of some extraneous non-experimental variables that she believes may affect the safety of the experiment because controlling them leads to more accurate results, which are (the place of application of the experiment - experimental extinction - class distribution - study material - time period - measurement tools - accompanying accidents)

#### ❖ **Research Procedures**

1- Defining the scientific material 2- Formulating behavioral objectives 3- Preparing teaching plans.

#### ❖ **Research Tools**

The research tool is a means of collecting data through which the objective of the research is answered and its hypotheses tested, and it is also called by means of measurement such as the questionnaire, observation, interview and choices (Hassan, 2011: 54). And the nature of the current research requires a data collection tool, which is Visual achievement test practical.

#### - **Building an achievement test**

One of the requirements of the current research is to build an achievement test to measure achievement in the practical visual material for the research sample. The researcher followed the following steps:

#### - **Determine the number of test items**

The researcher formulated a number of test items, and the number of items was (40) items of the type of multiple choice, as they are appropriate with the time allotted for the answer and cover the topics and objectives of the experiments of the subject, where she gave one point for the correct answer and zero for the wrong and abandoned answer.

Preparing the test map (specification table): The specification table is a detailed scheme that determines the content of the test and links the content of the study material to the behavioral goals, and between the

relative weight that the teacher gives to each of the different topics, and the relative weights of the cognitive-behavioral goals at their different levels (Al-Khayat, 2010: 176) .

Accordingly, the researcher prepared a table of specifications according to the following steps:

- The weight of each chapter of the subject, i.e. the importance of each chapter, was determined based on the time taken for each semester, as in the following equation:

$$\text{The relative importance of the class} = \frac{\text{The number of behavioral objectives at a given level}}{\text{The total number of behavioral purposes}} \times 100$$

The percentage of the level of remembering (32%), comprehension (15%), application (23%), analysis (8%), structure (13%) and evaluation (8%) were a percentage of the total number of behavioral goals.

- The number of questions for each cell of the specification table was calculated as follows:

Number of questions per cell = level percentage x class percentage x total number of test items.

### **Drafting test items**

In formulating the achievement test items that measure the six levels of knowledge, comprehension, application, analysis, synthesis, evaluation) from the cognitive domain of Bloom's classification, the researcher relied on one of the types of objective tests (multiple choice) with four alternatives. The researcher has a score of one for the correct answer for each of the test items and zero for the incorrect answer after the researcher ascertains the apparent validity of the test.

- The researcher did the first reconnaissance experiment in order to find out the observations about the test and calculate the average time for the answer, as it was found that the test items are clear and that the average appropriate time for the answer is (35) minutes, by calculating the average of the first three answers + the average of the last three answers divided by (2) and it was (35) minutes.

As for the second exploratory experiment, it was a measure of the psychometric characteristics of the test, as the difficulty coefficient of the items ranged between (0.44-0.72), and thus all the items are considered acceptable. As for the discrimination coefficient, it was found that it ranges between (0.2-0.53) while it was found that the effectiveness of the wrong alternatives attracted the number of learners from the lower group who exceeded the number of learners from the upper group, and more effective the higher its value in the negative direction.

The researcher also calculated the stability of the achievement test by calculating the Kewder Richard equation -20 and found that the stability of the test is equal to (86%), as the reliability coefficient is good.

- The test in its final form: After confirming the validity of the test, the stability of the test, and the psychometric characteristics, the achievement test in the final form consists of (40) items and is ready to be applied to the research sample.

### **❖ Experimental application procedures**

- 1- The experiment was applied in the second semester of the year 2020-2021)) on Tuesday on 25/5/2021 on the two research groups (experimental and control), and the experiment ended on Sunday on

The impact of the Barman model in the achievement of students of the Department of Science - College of Basic Education in the subject of visual

25/7/2021, that is, it took A full academic semester (9 weeks) and one lecture per week for each of the experimental and control groups.

- 2- The experimental group was taught according to the Barman model and according to the daily teaching plans.
- 3- The achievement test was applied to the two research groups on Sunday (25/7/2021), and the students were informed of its date a week before the specified date.

❖ **Statistical methods:** The researcher used the statistical package for social sciences (10-SPss) and (Microsoft Excel) in processing the data.

### Chapter four presents and interprets the results

#### A- Results of the achievement test

- For the purpose of verifying the null hypothesis (there is no statistically significant difference at the level (0.05) between the average scores of the experimental group students who study according to the Barman model and the average scores of the control group students who are according to the usual method in academic achievement).

The arithmetic mean and standard deviation of academic achievement for the scores of the two groups (experimental and control) were calculated by the researcher and by applying the t-test for two independent samples, the results shown in the following table appeared:

Table (1) The results of the t-test for two independent samples of the two research groups (experimental and control) in the achievement test.

The group	Number of students	Arithmetic average	degree of freedom	T value		Statistical significance at level 0.05- function
				calculated	tabular	
Experimental	22	29.72	43	4.35	2.02	function
Control	23	23.91				

From the above table, it is clear that the arithmetic mean of the scores of the experimental group students in the achievement test was (29.72), while the arithmetic mean of the scores of the control group students amounted to (23.91), and the calculated (t-test) value was (4.35) which is bigger than the value of (t-test) tabular (2.02) at the degree of freedom of (43) and the level of significance (0.05), which indicates the existence of a statistically significant difference in favor of the experimental group in the achievement test.

In order to find out the size of the relationship between the research variable, whether that relationship belongs to the chance factor or to the independent variable, the Barman model, the researcher found the



scientific significance of the impact of the independent variable using the impact size equation as in the following table:

The impact of the Barman model on the achievement test	Calculated T-value	T-value square	Impact Size Value (U2)	Impact size level
	4.35	18.92	0.3	Very big

**Table ( 2 )**

The table shows that the calculated T-value is (35.4) and when squaring the T-value it turned out to be (18.92), and after processing the data statistically using the statistical program (spss), it was found that the impact size value amounted to (0.03), which means that the level of the impact size ( ), and From these results, the researcher found that the Barman model had a significant impact on raising the level of achievement for the visual material and for the benefit of the experimental group.

### **Second: Interpretation of results**

#### **A- Interpretation of the results related to the first hypothesis:**

The results of the research showed that the Barman model is positively effective in achievement, the researcher attributes these results, which led to the superiority of the experimental group over the control group in achievement, to:

- 1- The Barman model is more effective than the traditional method because it leads the students to a set of precise organized steps, which resulted in achieving high levels of knowledge.
- 2- The Barman model has stirred the minds of the students by presenting the topic of the lesson in the form of a problem or an issue, which led to arousing their curiosity about it and linking the problem or issue to the main ideas and concepts so that it leads to the generation of questions by the students to link all the effects and reasons leading to reaching solutions to the problem, and this requires They associate the information related to the issue or problem with the information they possess in their cognitive structure.
- 3- The change that occurred in the way of presenting the scientific material through the Barman model made the students the focus of the educational process, giving them a positive role and increasing their academic achievement.
- 4- The interaction in educational situations increased due to the ability of the Barman model with its educational steps to help students to participate positively, which enhanced self-confidence, diversity of visions, treatments, and the ability to conclude.

### **Third: Conclusions**

- 1- Teaching using Barman's practical visual model led to an improvement in the level of academic achievement in this subject among second-year students - Department of Science - Physics branch compared to the usual method.

The impact of the Barman model in the achievement of students of the Department of Science - College of Basic Education in the subject of visual

- 2- This model can be applied by teachers and professors in light of the possibilities available in Iraqi universities.

#### **Fourth: Recommendations**

- 1- Emphasis on the necessity of adopting the Barman model in teaching practical visual at university levels in light of the available possibilities.
- 2- Informing the teachers of the visual material practical about the modern methods of teaching and in the name of the Barman model through holding training courses and seminars on how to prepare them.

#### **Fifth: Suggestions**

- 1- Conducting a similar study that reveals the impact of the Barman model on other dependent variables such as the acquisition of physical concepts, high-order thinking, reflective thinking, etc.
- 2- Studying the impact of the Barman model in other educational stages such as middle and high school.

#### **Sources**

- Al-Bayati, Abdul-Jabbar Tawfiq, and others: (2015) **Methods of Scientific Research**, 2nd Edition, Al-Warraaq for Publishing and Distribution, Amman.
- Al-Tamimi, Amira Mahmoud and Rasha Hekmat Jamil, (2015): The impact of the Barman model in developing the reading comprehension of fourth-grade literary students in reading, (**published letter**) Diyala University Journal, No. (66).
- Hassan, Barakat Hamza (2011): **Research Methods in Psychology**, Anglo-Egyptian Library, Cairo.
- Al-Khayyat, Majid Mohammad (2010): **Basics of Measurement and Evaluation in Education**, 1st Edition, Dar Al-Raya for Publishing and Distribution, Amman, Jordan.
- Zayer, Saad Ali and others (2017): **The Contemporary Educational Encyclopedia** (Part Two), i 1, Dar Safaa for Publishing and Distribution, Amman.
- Zayer, Saad Ali and others (2014): **The Contemporary Educational Encyclopedia**, Nour Al-Hassan Library, Baghdad, Iraq.
- Al-Saadi, Hassan Hayal and others (2021): **Contemporary Educational Studies Foundation**, 1st Edition, Dar Al-Sadiq Al-Thaqafiah.
- Saidi, Abdullah bin Khamis Ambo, Al Balushi Suleiman bin Mohammad (2009): **“Methods of Teaching Science”**, 1st Edition, Dar Al Masirah for Publishing and Distribution, Amman.
- Al-Abadi, Haider Abdul-Razzaq Kazim (2015): **The basics of writing scientific research in physical education and sports sciences**, 1st Edition, Al-Ghadir Printing and Publishing Ltd., Basra, Iraq.
- Abdul Rahman, Anwar Hussein, and Adnan Haqqi Shihab (2007): **Methodological patterns and their applications in the humanities and applied sciences**, 1st edition, Al Wafaq Company Press, Baghdad.
- Obeidat, Thouqan, and others (1992): **Scientific research, its concept, tools and methods**, 4th edition, Dar Al-Fikr, Amman, Jordan.
- Al-Afoun, Nadia Hussein, and Hussein Salem Makawn, (2012): **Training a science teacher according to the constructivist theory**, i 1, Dar Safaa for Publishing and Distribution, Amman.

- Faleh, Dhiaa Hannoun (2017): The impact of the Barman model on the achievement of chemistry and convergent thinking among fifth-grade students, **Master's thesis**, College of Education for Pure Sciences / Ibn Al-Haytham, University of Baghdad.
- Saleh, S. J., & Majeed, S. J. (2021). Motivation toward English Language Learning among Iraqi University Students. *Middle Eastern Journal of Research in Education and Social Sciences*, 2(3), 46-56. <https://doi.org/10.47631/mejress.v2i3.294>
- Qandelji, Amer Ibrahim (2019): **Scientific research and the use of traditional and electronic information sources**, Dar Al Yazurdi Scientific for printing.
- Smerdon. R. E and Burkam. J.D personalizing Feed Back between teacher and student in the context of a particular model of distance teaching, *British Journal of Educational Technology*, Vol. 12, No.2 1999, p. 140.
- Matsvange, M., Mugomba, J. ., Sithole, S. ., & Murumbi, A. . (2021). Early Childhood Development Trainee Teachers' Perceptions on E-learning Implementation during the COVID-19 era in Harare Metropolitan District, Zimbabwe. *Middle Eastern Journal of Research in Education and Social Sciences*, 2(3), 97-110. <https://doi.org/10.47631/mejress.v2i3.301>
- Yager, Robert E., (1991). The Constructivist Learning Model, *Science Teacher*, 58(6), p52-57