The Effect of Using the Cognitive Strategies on the Achievement and Practical Performance of Physiology (Modeling / Reciprocal teaching)

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Abstract

The research aims to know the impact of using the strategies of cognitive perception on the achievement and practical performance of physiology, and to achieve the goal of the research under the formulation of zero hypotheses: There is no statistically significant difference at the level of (05.0) between the average grades of students in the achievement of students of the three groups of physiology. There is no statistically significant difference at the level of (05.0) between the average grades of students in the practical performance of the students of the three groups of physiology. The research community consisted of the students of the first stage in the Technical Institute. The sample was randomly tested as it reached 45 students. The equivalence between the research groups was confirmed through the following variables: (Age, Intelligence). As for practical achievement, (15) objective test items were drafted covering the subject, and to ensure the validity of the test was presented to a number of experts specialized in education and teaching methods, and the validity and consistency of the discrimination factor and the difficulty factor and the effectiveness of alternatives to the test were calculated.

Keywords: *Cognitive strategies***,** *Modeling, Reciprocal teaching*

Introduction

Recent studies emphasize that the student is the focus of the educational process and the adoption of work and experience a cornerstone of education [1], and the Institute as one of the educational institutions provide a service to the community and seeks to develop and keep [2] pace with technological development to educate the student to sound thinking and equipped with basic knowledge and skills. Physiology is one of the important subjects of life sciences, and despite its importance, this article is still taught by dumping and recipients by the teacher, and this is consistent with a lot of research and studies, but the use of regular methods in the field of education leads to poor understanding and correct perception, and weak Students have different thinking skills to solve the daily problems they face in the study [4]. Therefore, the development of mental abilities has become the main objective of the educational process in all countries of the world, as the progress of countries is measured by their ability to develop the minds of their children. To achieve this, many countries have made strenuous efforts and conducted many practical research aimed at regulating student thinking. [25]

Teaching methods are not the same but are the result of social needs and circumstances and demands are changing educational goals and concerns to meet the requirements of society [7]. And the importance of teaching methods and to achieve educational goals and the adoption of modern methods of teaching, including a symposium held at the University of Baghdad (1993), where recommended to contribute to the development of the educational process.

Therefore, studies and researches turned to metacognition theory, which cares for the student to monitor, control and learn. This helps to acquire different learning processes that encourage students to think and be able to solve their scientific problems [7]. This supra-cognitive strategy means thinking and helping the student positively in gathering, organizing, following up and evaluating information during the learning process. This supra-cognitive strategy contributes effectively to

the learning and problem-solving process as it helps to achieve learning objectives and helps students to access cognitive processes.

Laboratory and practical performance:

Genesis of laboratory work:

Scientists in the field of laboratory work, such as Avicenna in medicine and optics, and Ibn Hayyan in chemistry, became famous in the field of chemistry. The idea of experiments began in Britain and Germany, and the teaching of science in the United States in 1874 was questioned.

Laboratories were set up in high schools and colleges in the late 18th century, believing that students would learn better by repeating the original experiences of Newton, Priestley and others.

The performance:

Performance is the unit of measurement of knowledge that the student shows in the situation and is the product of interaction, understanding and thinking that the student employs in the situation. What the student shows is the product of a comprehensive mental work that includes a response to the world and the knowledge system in an integrated environment.

Performance includes:

1. Performance Tasks: They are direct and realistic and require:

Performing a series of activities or performing a particular work.

Compound products (products) that achieve certain quality levels or present these products as an integrated unit separate from performance.

Performance Requirements:

The skill has three components and can even achieve practical performance: -

1. Information, knowledge and concepts.

2. Movements and coordination between movements.

3. Values and trends adopted by the student who is trained to perform the skill.

Laboratory performance evaluation:

The laboratory work falls under four aspects or aspects of laboratory activity:

1. Planning and design: involves students doing laboratory activities - forming questions - predicting results.

2. Performance: It includes students' laboratory achievements on experiments - observation, recording of data and drawings.

3. Analysis and interpretation: Data processing, interpretation of relationships, ask new questions.

4. Application: The student to make scientific predictions in new situations. (Zeitoun, 2007, 668)

Research Procedures

Determine the research community:

Determining the study population is one of the important methodological steps in educational research.

The research community was identified by the Technical Medical Institute / Baghdad for the academic year (2018-2019).

The research sample:

Research sample testing is one of the most important factors that influence experimental research. The research sample was selected from the students of the first stage of the Technical Medical Institute/ Baghdad. The sample was divided into (a) taught by supra-cognitive strategies (modeling), (b) taught by (reciprocal teaching), and (c) taught routinely.

Table 1. Distribution of research sample among groups and number of students

Groups	Group Name	Number Of Students Before Exclusion	Number of Students After Exclusion	Final Number
First Experimental Group	A	19	5	14
Second Experimental Group	B	18	2	16
Control Group	C	17	2	15

Experimental design test:

Experimental design is of great importance, as it ensures scientific accuracy

This study had two factors: the cognitive strategy (cognitive) (modeling) and (interactive teaching), so the experimental design was adopted three groups of two experimental groups and a control group.

Table 2. Experimental design was adopted three groups of two experimental groups and a control group.

Groups	Equivalence	Independent Variable	The Dependent Variable
First Experimental Group	Age	Strategy Of Cognitive Supra-Cognitive Modeling	Collection
Second Experimental Group	Intelligence	Interactive Teaching	Practical Performance
Control Group		Normal Way	

Equal groups:

(A) Chronological Age in Months:

The mean age of the students was calculated in months, and extracted the mean of

B- Intelligence:

To find out the intelligence of the research sample. The Raven test is applied because it is characterized by honesty, consistency, usability and age group. After finding IQ scores (60), the mean was calculated for all the research groups, where the ratio was (73.44, 00.46, 00.45).

External safety of experimental design:

Although groups were randomly tested, non-experimental variables that affect the safety of the experiment were attempted.

1. Adjust the contrast tools: Achievement test was used for the three research groups.

2. Duration: The duration of the research was determined (the first course).

3. Quotas: Quotations were distributed two hours each week to ensure equal time allocated to the laboratory.

Search Requirements:

1. Determination of scientific material: The scientific material of physiology (course I) was determined.

2. Preparing the teaching plan.

3. Study Plan: It is a framework or set of procedures or are the steps organized to make the teaching process a success. (Abdulsalam, 2001, 72)

4. Preparation of experimental work guide: Then prepare experiments for conducting in the laboratory.

Test stability:

The stability of the test was calculated by Alfa Kronbach, where the stability was (83.0).

Statistical means:

1. Analysis of monotonous variance:

Variance analysis was used for the equivalence of the three research groups.

2. Difficulty Coefficient:

The difficulty factor for the objective paragraph was used for achievement test.

$$P = \frac{n_u + n_L}{2n} \frac{n_u + n_L}{2n}$$

3. The power of discrimination:

$$D = \frac{P_u + P_L}{\frac{1}{2}(n)} \frac{P_u + P_L}{\frac{1}{2}(n)}$$

4. Alpha-Cronbach equation: Achievement test coefficient.

5. Tukey Method: Indicates the difficulty of the differences between the results.

$$Q = \frac{X_1 - X_2}{\sqrt{MSW}} \frac{X_1 - X_2}{\sqrt{MSW}}$$

Results

1. The first hypothesis:

To achieve the first zero hypothesis (there are no statistically significant differences at the level of 0.00 between the average scores of students of the three groups studied by modeling and the second group by interactive teaching and the control group by the normal method) and the arithmetic mean of the three groups was calculated in the achievement test as shown In the table.

Table 3. Results of mono-variance analysis to show significant differences in achievement

Contrast Source	Total Squares	Degree of Freedom	Average Squares	Calculated Value	Tabular Value	Statistical Significance
Between Groups	43,513	2	22,256			
Within Groups	13,366	42	77,7	35,28	1503,3	0.05
Total	58,880	2				

The above table shows that the calculated Y-value was (35.28) and the tabular Y-value (1503.3), that is, the calculated Y-value is greater than the tabular Y-value, which affects the existence of statistically significant differences in the achievement of the three research groups. There was a statistically significant difference, so the T method was used to compare two equal media to identify the differences. (Al-Bayati, 2008, 264). Therefore, the tabular value (Q) (38.0) was calculated, as well as the calculated (Q) value (43.3) between the two media. This indicates that there is no statistically significant difference between the first and second experimental groups in the collection.

Table 4. The results of the analysis of comparison between the differences of the average of the three groups

the group	Averages	The difference between averages	The calculated Q value	The Q value is	tabular Significance at 0.05
Total Experimental 1	3,20	3,0	38,0	43,3	NonFunction
Total Experimental 2	6,20				
Total Experimental 1	6,20	0,7	2,9	43,3	Function
Total Controls	3,13				
Total Experimental 2	6,20	2,7	6,9	43,3	Function
Total Controls	3,13				

The table shows that the value of (Q) calculated between the first and control groups (2.9) is greater than the table value (Q) of (43.3), and this shows a statistically significant difference between the first experimental and control groups in favor of the experimental group. First.

In addition, the value of (Q) calculated between the first and control groups of (6.9) was greater than the tabular value of (Q) of (43.3). This indicates that there is a statistically significant difference in the achievement between the second and control experimental group. In favor of the second experimental group.

2- The second zero hypothesis: which provides (the absence of statistically significant differences at the level of 0.0.0 between the average degrees of practical performance of students of the three groups).

Table 5. The results of the analysis of unilateral variation to show individual differences in practical performance among students of the three groups

Contrast Source	Total Squares	Degree of Freedom	Average Squares	Calculated Value	Tabular Value	Statistical Significance
Between Groups	40,371	2	20,185			0.05
Within Groups	60,204	42	89,4	04,37	1503,3	
Total	00,576	2				

The table shows that the calculated Y-value was (04.37) and the tabular Y-value (1503.3), that is, the calculated Y-value is greater than the tabular Y-value. This indicates that there are statistically significant differences at the level of (05.0). In the practical performance of the three research groups. Using T method to identify differences between groups. Table (8) illustrates this.

Table 6. The results of the comparison analysis between the mean differences for the three groups in the practical performance

The Group	Averages	The Difference between averages	The Calculated Q value	The Q value is	Tabular Significance at 0.05
Total Experimental 1	6,16	2,3	6,5	43,3	Function
Total Experimental 2	8,13				
Total Experimental 1	6,16	0,7	2,12	43,3	Function
Total Controls	6,10				
Total Experimental 2	8,13	2,4	3,7	43,3	Function
Total Controls	6,10				

The table shows that the calculated value of Q (6.5) is greater than the tabular value (Q) of (43.3). This indicates that there is a statistically significant difference between the first and second groups in practical performance and for the benefit of the first experimental group.

The table also shows that the value of (Q) calculated between the first experimental group and the control group of (2.12) is greater than the value of the (Q) tabular value of (43.3). First experimental group.

Conclusions

The researcher reached the following conclusions:

1. Teaching according to the strategy of cognitive supra-cognitive has had an impact in increasing students of the Technical Technical Institute

2. Teaching according to supra-cognitive strategies of practical performance has had an effective effect in raising the level of students.

3. Teaching according to this strategy requires more time and effort for the teacher and student than is required when using other teaching methods.

4. Teaching according to supra-cognitive strategies has affected students who have awareness of their knowledge and are more organized in their performance of experience than students who do not.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Technical medical Institute –Baghdad and all experiments were carried out in accordance with approved guidelines.

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