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"Effectiveness (KUD) strategy in future thinking among fourth grade scientific students in the subject of physics"

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Abstract :

The current research aims to identify the impact of the (KUD) strategy on the future thinking of fourth grade students in the subject of physics. The research sample included two groups, one of which was the experimental group and the number of its students was (58) students, and the other was the control group and the number of its students was (62) students. The two researchers (central preparatory for boys) affiliated with the General Directorate of Education in Muthanna Governorate/the center randomly, from the research community, as the researchers adopted the experimental research approach as a method to conduct their research, which includes an independent variable (KUD) strategy and a dependent variable (future thinking). The researchers chose the experimental design to adjust the research variables, and before starting to apply the experiment, the researchers were rewarded between the two research groups to obtain accurate results with the following variables: (students' chronological age calculated in months, parents' academic achievement, mothers' academic achievement, previous biological information test, Daniels Intelligence Test). When conducting the equivalence between the two research groups, the researchers prepared the research requirements of plans, objectives and tests for the two research groups, and upon the completion of the application of the experiment, the researchers applied their research tool to the two research groups, and after analyzing the results statistically, the researchers obtained data for the two research groups, and these data were statistically processed by testing (t-test) for two independent samples, and the results showed the students of the experimental group to be superior to the students of the control group according to the strategy (KUD) in future thinking.

Keywords: KUD strategy, future thinking

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expectations, alternatives and options that are being looked forward to. Future thinking is concerned with dimension Time ensures cognitive outcomes such as charts, predictions, innovations and creative outcomes based on long-term imaginary thinking. It provides the learner with a great opportunity for change at all levels and helps in creating healthy environments to make informed and deep decisions (Al-Husseini,2021: 130-132). Most of the methods used in teaching do not encourage future thinking and to ensure the existence of the problem. The two researchers submitted a questionnaire to physics teachers in ten schools, who teach physics to fourth grade students in the Directorate of Education

Article One
Definition of research
First : The research problem:

The subject of physics is still hostage to the usual methods that focus on theoretical aspects, conservation and indoctrination rather than on thinking. Future thinking is also the focus of contemporary educational studies in the current era, where it focuses on the nature of changes for the individual and the group in order to set future goals based on understanding these changes and extrapolating the effects of current events in the future to form a future picture of what will happen in society in the near future. Future thinking is based on a future vision that includes potential

activities presented therein to research, explore, experiment and develop hypotheses and test them, as well as rebuilding basic concepts or knowledge structures by interacting with activities and classroom and environmental experiences around them, and this requires knowing the learner's concepts, then presenting positions that challenge his perceptions and non-scientific interpretations, and giving him the opportunity not to usually build new concepts that are logical and convincing to him. (Yassin and Raji,2012: 106). (Al-Huwaidi,2005) refers to the importance of modern teaching methods, which are to make the student in the first place among the elements of the learning process in order to improve academic achievement, especially the subject of physics, for the numbers of students to participate effectively in civilian life and to be productive and educated individuals throughout their lives.Al-Huwaidi, 2005: 49) The educational importance of future thinking is summarized as follows:

1- To equip the current generations in the various stages of education with the skills of future thinking, as this opportunity will not be available to solve the problems of the present while they are asked to contribute to solving the problems of the future.

2- The east of the future is the ultimate goal of the present and the future of any society. The absence of future thinking from the minds of students leads to the absence of belonging and identity, which puts society at risk

3- Linking the past to making decisions about the future.

4- Giving students the opportunity to develop the necessary skills to live in a constantly changing world.

5- Enabling students to accurately identify their real abilities that will enable them in the future.

6- Linking individuals' thinking to their outside world,and strengthening their sense of control over their future lives. (Abdul Hafeez,2014 : 441).

Third: The goal of the research and its hypothesis: The current research aims to identify the effectiveness of the strategy (KUD)in the future thinking of fourth grade of Muthanna Governorate, as the questionnaire included a set of questions that the researchers assume will affect, including Do you have prior knowledge of future thinking? And does your pedagogy encourage future thinking? Teachers confirmed the validity of what the researchers said, as the results of the questionnaire showed that a large percentage of teachers reach (88%) who do not have prior knowledge and do not encourage students to think ahead, so the researchers considered to experiment with a modern teaching strategy (KUD) Which may help students increase their future thinking in the subject of physics, and educational studies and research have indicated that the failure to develop future thinking in students, may generate a state of decline in their academic achievement and cognitive comprehension, including the study of (Zidane and Anwar, 2016) and the study of (Ahmed and Sahib,2013) and the study of Ghadib (2019). It recommended the need to give future thinking an important role in the educational implications of the curriculum, as there has become an urgent need to educate a educated generation that depends on the skills of thinking completely through the development of students' minds and their future thinking, and thus the problem of research was to answer the following question: What is the effectiveness of (KUD) strategy in the future thinking of fourth grade students in the field of physics?

Second: The importance of research:

Teaching methods have become a key to the learner's acquisition of scientific capabilities, and the process through its focus on thinking skills, which contribute with knowledge to building and enabling the learner to acquire and understand science, and the learners are the ones who carry out these processes through the use of scientific investigation and exploration, which gives them the experiences and skills necessary to be an explorer of the nature of the world around them. (Al-Najdi et al., 2005 : 38) One of the most important modern strategies is the structural strategies whose idea is based on presenting problems and attitudes to learners that are functionally related to their lives and environment, and among these structural strategies is a strategy (KUD). Learners work through the

(Al-Husseini and India, 2021) "It is a structured scientific jurisprudence that aims to formulate a set of conditional predictions that include the basic features of the conditions of a society or a group of societies over a certain period of time by focusing on factors and elements that can be changed by issuing decisions,as well as defined as a complex mental activity based on understanding, analysis and synthesis of student information about past and present problems and issues in order to form a mental image and reach expectations regarding the future of these issues and problems and make judgments on them, and then plan and make appropriate decisions to solve these problems in the future (Al-Husseini and India, 2021, 101)

The researcher defines it procedurally : The student's ability to use future thinking in the subject of physics for the fourth scientific grade through the application of the KUD strategy, and it is measured through the scores obtained by the fourth scientific grade students in the test, which the researcher prepared for this purpose

Chapter 2

Theoretical background and previous studies

The first axis: Theoretical background

Structural Theory Strategies: Several modern philosophies have emerged, each of which is the basis for teaching methods that are adopted in the educational process, and among these philosophies (structural philosophy), from which several teaching methods are derived, on which several strategies and various educational models are based. Structuralism is based on the philosophy that, if a plant makes (build) its own food, isn't it better for the human being (the learner) to build his own knowledge, and perhaps the educational saying (I hear, forget, see, remember, work, understand) may be the last part of it represents the heart of the structure, that is, education for understanding.)Zeytoun,2007 :19)) , and there are many strategies and teaching methods included in educational literature derived from structural theory, including :

KUD **strategy:** One of the strategies based on structural theory was adopted by Carol N. Tomlinson, professor of educational leadership at Curry College of Education at the University of Virginia in 1999 to find out what learning students in the scientific subject of physics and to achieve the goal of the research, the researchers formulated the following zero hypothesis:

There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who will study physics according to the strategy (KUD) and the average scores of the control group students who will study the same subject according to the usual method in the future thinking test prepared for the purposes of this research.

Fourth: The limits of the research: Identifies the current research as:

1. **Spatial boundaries:** Government preparatory and secondary schools belonging to the General Directorate of Muthanna Education/Governorate Center (Central Preparatory for Boys).
2. **Temporal Limits:** The first semester of the academic year (2021-2022).
3. **Human boundaries:** fourth grade scientific students.
4. **Cognitive limits:** The first five chapters of the book of Physics for the fourth scientific grade, Edition 10, 2019, written by Muhammad, Qasim et al., as follows: (Chapter 2: Mechanical properties of the material, Chapter 3: Static fluids, Chapter 5: Light).Note that the first and fourth chapters were deleted by the Ministry of Education.

Fifth : Definition of terms:

Strategy (KUD) : Defined by :

(Yassin and Raji,2012) that : "An educational strategy based on the constructivist theory consists of three stages (know, understand, work) that increases the learners' potential and abilities by providing an appropriate educational environment that takes into account their individual differences in experiences and levels of perception and differences in the social and cultural environment." (Yassin andRaji,2012: 139)

The researcher knows it procedurally:

The researcher knows it procedurally : a set of sequential and interrelated stages (know, understand, work) that the researcher applies to the students of the experimental group for the purpose of achieving the goals of his research .

Future thinking defines it:

and issues effectively, and linking the thinking of individuals to their external world, and strengthening their sense of control over their future lives, and enabling students to determine their real abilities that enable them in the future accurately, as well as equipping current generations in the multiple stages of education with future thinking skills, as this opportunity will not be available in solving present problems at the time when they are asked to contribute to solving future problems. (Abdul Hafeez,2014 : 441).

The second axis: Previous studies:

After exposing the researcher to the educational literature, and by conducting a survey of scientific databases and search engines specialized in Arab and foreign studies, and corresponding with many Iraqi and Arab universities, he concluded that there are four previous studies that dealt with future thinking skills, and these studies are as follows:

- **Al-Mutairi Study (2018):** The study aimed to build a list of future thinking skills that should be addressed by the physics course and then analyze the content of this course to determine the extent to which it contains the skills
- **Write-off study (2018):** The study aimed to identify future thinking among students of Qadisiyah University
- **Al-Jubouri Study (2019):** The study aimed to identify the impact of the Wasili enrichment strategy on the acquisition of psychological concepts among fifth grade literary students and the development of their future thinking
- **Alwan Study (2020):** The study aims to identify the graduated activities and their future thinking

Chapter Three

Research Methodology and Procedures

First: Experimental design: The selection of experimental design is one of the important things that the researcher does, because it helps the researcher in determining the factors surrounding the experiment, as the researcher can know what is happening and what he is doing, and since the current research includes two variables: the independent variable represented by the strategy (KUD), and the dependent variable (future thinking), so the experimental design with partial adjustment was chosen, and as shown in Figure (1).

outcomes a student should achieve. Before a teacher and students begin teaching a unit of the curriculum, he needs to know what they will learn during this module. (Tomlinson, 2001:1) The strategy (KUD) is a three-letter word, each of which indicates a meaning of its own and at the same time represents a stage of the strategy consisting of three stages:

1. **(K) Means (KNOW) Meaning (knows) : The learner needs to know** (facts,dates, definitions, roles, people,and places) Knowledge is a revolution in understanding learning and the learner and transforming the learner from a marginal negative individual to an active and active vital individual, and it is one of the doors of study and research to understand the learner's learning methods, treatments, and organization of his knowledge. (Qatami,2013: 135)
2. **(U) Means (UNDERSTAND)** Meaning (understand) : The learner understands the basic facts, big ideas, principles, generalities, rules), within a specific cognitive field or subject within a cognitive field. Without understanding, the student or individual cannot exercise the higher mental abilities than the application, analysis, installation and evaluation . (Khatiba,2005: 55)
3. **(D) Means (DO) Meaning (work or application)**: As for this stage, the student performs basic skills such as ("thinking skills, literacy skills, communication, use of numbers, planning and production") That is, at this stage, he can use all the information he learned at the level of knowledge and understanding in new situations. (Tomlinson, 2005 : 33)

Forward-thinking

It is defined as a complex mental activity based on understanding, analysis and synthesis of student information about past and present problems and issues with the aim of forming a mental image and reaching expectations related to the future of these issues and problems and making judgments on them, and then planning and making appropriate decisions to solve these problems in the future (Al-Husseini and India, 2021: 101), and it is of great importance in our lives, as it helps the individual to play a positive role in his society by his ability to participate in solving his problems

Figure (1) : Experimental Design

group	The independent variable	Dependent variable	Search Equipment
Experimental group	Strategy (KUD)	Educational Achievements	Academic Achievement Test
Control group	The usual way.		

and secondary schools for boys that contain two or more divisions, which are located in the governorate center, as they numbered (11) schools, and Table (1) shows this.

Table (1) Preparatory and secondary schools for boys that have two or more divisions for the fourth grade in the center of Muthanna Governorate for the academic year (2021-2022)

Second: The research community and its sample:

A- The research community: The current research community represents the government preparatory and secondary schools for boys only, which are affiliated with the Directorate of Muthanna Education/Governorate Center. The researchers visited the General Directorate of Muthanna Education to identify preparatory

B - Research sample: The research sample is divided into:

No.	School Name	Gender	Number of students in the fourth scientific grade	Number of divisions for the fourth grade of science
1	Samawah Preparatory School for Boys	Males	372	7
2	Nahj Al balaghah prep.	Males	361	8
3	Al Irtiqaa Secondary School for Boys	Males	244	9
4	Martyr Al Sadr Prep	Males	420	11
5	Al-Fursan Preparatory School for Boys	Males	250	3
7	Al Hadi Al Amin High School	Males	152	5
8	Al anwar High School	Males	270	4
9	Al wadi High School	Males	415	6
10	Al taakhi Secondary	Males	137	4
11	Central Middle School	Males	328	6

B - Sample of students: After the two researchers (Central Preparatory for Boys) chose to apply the experiment, the researcher visited the selected school, and found it contains six study divisions for the fourth scientific grade, as the number of students reached (328) students distributed among six study divisions, and the number of students in one division reached respectively (59, 52, 58, 64, 50.45), as the research sample consisted of two divisions (A,D) of 122 students, and the researcher chose a division (D) randomly to represent the experimental group that will study the subject of physics according to the

A- Sample schools: The two researchers (**Central Preparatory Boys**) in the center of Muthanna Governorate intentionally chose to conduct his research for the following reasons:

• The headmaster and school owners cooperated with the researcher in completing the experiment in support of the educational process and keen to know the results.

• The location of the school is close to the location of the researcher, as the location of the researcher and the school is located in one geographical area, which makes it easier for him to reach the school and prepare the procedures of the experiment.

final number of the research sample (120) students by (58) students for the experimental group and (62) students for the control group as shown in Table(2).

strategy (KUD), and in the same way he chose a division (A) to represent the control group that will study the same subject in the usual way, and (2) students were excluded, thus the

Table (2) Distribution of the research sample to the experimental and control group before and after exclusion

group	Section	Number of students befc exclusion	No. of Student Fail	Final Student Count
Experimental(KUD strategy).	d	58	0	58
Control(normal method).	A	64	2	62
Total		122	2	120

months, the Daniels test for intelligence, the future thinking test), and as shown in Table (3).

Third: The equivalence of the two research groups: The researchers were keen to conduct the equivalence with the following variables: (the students' chronological age calculated in

Table (3) arithmetic mean and standard deviation and the calculated and tabular values of the variable (chronological age, Daniels intelligence test, future thinking scale) for the two research groups

Variable	group	Numb er	arithme tic mean	standa rd deviati on	Varian ce	Freed om degree	Lost Values		sig
							Calcula ted	tabul ar	
Chronolog ical age	Experime ntal group	62	191,87	7,65	58,54	118	1.125	2	Statisticall y nonfuncti onal
	Control group	58	191,71	6,65	44:28)				
IQ test (Daniels)	Experime ntal group	62	20:40	4,15	5:20 PM		1,384		
	Control group	58	19:38	3,95	15,57				
Future Thinking Scale	Experime ntal group	62	109,24	41,98	1762,0 2		971		
	Control group	58	117,07	46,32	2,145. 43				

study or the dependent variable undesirable and the researcher cannot observe or measure it (Hamza et al.,2016 :62). It is a fixation of the factors and variables related to the phenomenon under research with the exception of the independent factor, and during the experiment, a set of factors and variables affecting the research experiment appear, specifically affecting the dependent variable may be in its favor or against it, and in order to obtain good results, and to know the impact of the independent factor, the external variables

The above table shows that the calculated value for (chronological age, intelligence test (Danley's) and future thinking test) reached (1.125, 1.384, 0.971) in order of (1.125, 1.384, and 0.971), which is less than the tabular T-value (2), so the above variables for the two research groups (control and experimental) were equalized.

Fourth: Control of extraneous variables:

The extraneous variable is not included in the study design and is not subject to the control of the researcher, but it affects the results of the

scientific material, research requirements, and classes), as the two research groups studied according to the prescribed quotas for physics by three quotas per division per week, and according to the distribution of the school administration of quotas as shown in the following table:

must be controlled before the experiment is conducted, in the sense of limiting all variables except the independent variable in order to isolate them and prevent their impact on the result. The two researchers have adjusted all the external variables that affect the conduct of the experiment, including (sample members, physical factors, duration of the experiment,

Table (5) Distribution of lessons between the experimental group and the control group

AlYaum	group	Section	Lesson	Time
Saturday	Control group	A	The first	(8,00- 8,45)
	Experimental group	d	Second	(8,50 - 9,35)
Sunday	Control group	A	Second	(8,50 - 9,35)
	Experimental group	d	The third	(9,40 - 10,25)
Monday	Control group	A	The third	(9,40 - 10,25)
	Experimental group	d	Four	(10,30 - 11,15)

Edition 10, 2019, written by Muhammad, Qassem and others, during the first course in a coherent and integrated manner objectives for each of those three chapters and unified with what the curriculum aims at in general, as determined by the following(Chapter 2: mechanical properties of the material, Chapter 3: static fluids, Chapter 5: light).Note that the first and fourth chapters were deleted by the Ministry of Education.

Fifth: Research requirements: Before applying the experiment, it is necessary to prepare the basic requirements of the experiment, which are :

• **Determination of the scientific subject:** The researchers identified the scientific subject that will be taught to the students of the two research groups during the duration of the experiment, so it included the chapters that are taught within the annual plan for the content of the fourth grade physics subject of science,

Table (6) Topics to be taught during the trial period

No.	Terminations	Class Title
1	Second	Mechanical properties of the material
2	The third	fluid statics
3	Five	light.

behavioral goals were calculated and compared with the tabular value of (150) degree freedom (1) and at the level of significance (0.05), and the results showed the validity of all behavioral purposes according to the opinions of experts and specialists, and specialists, and all purposes were adopted and retained in their final form (109) behavioral purposes, by (30) goals for the level of recall, (24), (26) goals for the level of comprehension, (15) goals for the level of application, (6) goals for the level of composition, and(8) goals for the level of evaluation.

Preparation of teaching plans: The teaching plans were prepared by the two researchers for

Formulation of behavioral goals: (109) behavioral goals were formulated by the researchers based on the general objectives and the content of the material to be studied in the experiment, distributed among the levels of Bloom's classification (remembering, comprehension, application, analysis, composition, evaluation), and to ensure its validity and fulfillment of the content of the study material, the researchers presented it to a group of specialists in the educational field and teaching methods, and as a result of the analysis of the responses of the (33) arbitrators, some objectives were modified according to their opinions and observations, as the values of a square (K2) for each of the

and arbitrators in the field of education and their teaching methods, and through their directives, some paragraphs were modified to be ready for implementation .

Second: Correction of the scale:

Before piloting the scale, the researcher prepared special instructions to correct it as follows:

- One grade is given to the student when he answers a correct answer to each paragraph.
- A score of zero is given to the student when he or she answers a wrong answer to each paragraph.
- The answer is incorrect if the paragraph is left unanswered or when choosing more than one alternative .

Thus, the test score ranged between (zero) as the lowest score and (38) as the highest score.

Third: Test validity the scale validity is one of the basic characteristics necessary and required in the preparation of the scales, and the true scale is the measure that measures the feature that was set for its measurement (Allam, 2019 : 139), and the apparent validity of the future thinking scale has been extracted, which is as follows:

1- Apparent validity: The scale is required to be presented in its initial form by presenting it to a group of experts and specialists related to the subject of the scale, and based on the approval of the experts, the validity of the scale can be reached. Thus, the scale appears to measure what was set to measure it (Welded, 2017: 126), and to verify the apparent validity, the scale was presented to a group of experts and arbitrators specialized in the field of education and teaching methods, to express their views on its validity. The Kai square was used to analyze the opinions of experts and adopted an agreement ratio (85%) or more as a criterion for the validity of the test paragraphs and its suitability to measure the quality for which it was set. The percentage and the Kai square were used at the level of significance (0.05) to analyze the responses of the arbitrators to the paragraphs of the scale, and the most of the Kai paragraphs obtained the approval of the experts and the specialized arbitrators on their validity and suitability for the purpose for which they were set, and some paragraphs were modified until the scale was ready in its final form, and the percentage and the test ranged between(90%). The value of the topics of physics to be studied during the experiment, according to the content of the textbook and the behavioral goals formulated, and according to the strategy (KUD) For the students of the experimental group, and according to the normal method for the students of the control group, and then the researchers presented two model plans to a group of specialists in the educational field and teaching methods, to survey their opinions, observations and proposals in order to improve the formulation of these plans, in line with ensuring the success of the experiment, and according to what the arbitrators showed, the two researchers made some necessary adjustments to them, and they became ready for implementation.

Sixth : The research tool: One of the important and basic things that the researchers identify and build is the preparation of research tools, and the research includes a dependent variable is (future thinking) and therefore the research tool is the measure of future thinking and the following is a detailed preparation of the tool:

First - Preparing the measure of future thinking: Future thinking is the dependent variable in the current research, so it was necessary to prepare an appropriate scale to measure this variable for the students of the basic research sample. The scale was built in light of the following steps:

A- Determining the goal of the scale: The scale aims to know the future thinking of the research sample, which are fourth grade scientific students.

B- Determining future thinking skills: After exposing the researcher to the educational literature and studies related to future thinking, the researcher relied on the aspects identified by the study (Al-Mutairi,2018), and the study (Alwan,2020), which included a number of aspects of future thinking within the areas of (planning, prediction, positive thinking, scenario development, imagination, and perspective evaluation) .

C- Formulation of the paragraphs of the scale:

A measure of future thinking was prepared consisting of(38) test items of a multi-selection type consisting of the origin of the paragraph and four alternatives, one of which is correct and three of which are wrong to measure the levels of future thinking of students in the fourth scientific grade. The measure was presented to a number of experts

time for each student on his answer sheet, and by adopting the following equation:

Average Time =

Response time of student 1+response time of student 2...etc /$total\ number\ of\ students$

(Al-Najjar, 2010 : 36)

Average time = $\frac{1286}{30}$ =42.8 minutes 43 minutes

Second Reconnaissance Sample (Statistical Analysis Sample):

The future thinking scale was applied to a sample of (100) students from the Central Preparatory Boys School, and he supervised the application of the test in cooperation with the subject teacher. After correcting the answers of the students, the grades were arranged downward from the highest grade and were (38) to the lowest grade and were (5). The discriminatory force and the stability coefficient were extracted, and the upper and lower extremist samples were chosen by (27%) as the best groups to represent the entire sample. The following is an explanation of the procedures for the statistical analysis of the test items:

1- Difficulty coefficient: Using the difficulty coefficient for the objective paragraphs, it was found that the level of difficulty ranges between (0.30 – 0.50), which is an acceptable difficulty coefficient according to the standard set, as the paragraphs are good if their level of difficulty ranges between (0.20 - 0.80) and thus the paragraphs of the future thinking scale are good and appropriate (Al-Ataya,2011: 67).

2- The paragraph discrimination coefficient: The calculation of the paragraph discrimination coefficient was performed using its mathematical equation, and it was found that its ratio ranges between (0.39 – 0.75), and thus the paragraphs of the future thinking scale are distinctive, as it indicates (Al-Khatib, 2014). The paragraphs of the scale are good if the strength of its distinction is (0.20) or more(Al-Khatib, 2014 : 235). The paragraphs of the scale are therefore valid for their ability to distinguish between students.

3- **Effectiveness of the wrong alternatives:** The effectiveness of the wrong alternatives to the paragraphs of the future thinking scale was calculated and the results of applying the equation of alternatives to all paragraphs were the Ka square value of the scale was (1829), and therefore, (38), and (38).

2- the construction validity (internal consistency): that each paragraph of the scale must follow the same path as the total scale, which represents the coherent overall concept of the property to be measured for each paragraph of the scale and that its inconsistency means the need to delete or replace it. This can be verified in light of ascertaining the correlation between the performance of students on this paragraph and their performance on the overall scale is the test that leads to the validity of the construction of the scale (Zamli et al.,2013: 258), and the researcher has verified The validity of the construction of the future thinking scale despite its verification of the validity of the scale on the surface, and for this reason the researcher used the scores of the exploratory sample used in the statistical analysis to determine the extent to which the score of each paragraph is related to the total score of the scale, the researcher subjected the scores of the second exploratory sample of (100) students, to the analysis of the paragraphs, which is the same sample on which the discriminatory strength of the test paragraphs was calculated and according to the coefficient of correlation of the degree of each paragraph with the total degree of the test using the Pearson correlation coefficient, and the correlation coefficients ranged between (0.35-0.83), and thus all the paragraphs were statistically significant, and thus all the (38) paragraphs of the test were retained.

Applying the Future Thinking Test to the Reconnaissance Sample:

- **The first reconnaissance sample:**

To ensure the clarity of the paragraphs and to determine the time spent in answering all the paragraphs of the scale, the scale was applied to a survey sample of (30) students from the (Rhetorical Approach for Boys) School, and through the researcher's supervision of the application, he noticed that the instructions of the answer and the test paragraphs were clear through the lack of students' inquiry about how to answer, and the test time was calculated by finding the average time taken by the students of the first survey sample, which was represented by (43) minutes, as the times taken by all students were collected after recording the response

measurement. Thus, all test items were retained and the test was ready for application in its final form for the research sample.

Seventh : Statistical means:

The researchers used the SPSS statistical analysis software.

Chapter Four

Presentation and interpretation of results

First : Presentation of results: Results of the zero hypothesis: The two researchers prepared the measure of future thinking, and it was applied to the two research groups. After applying the test, the researchers corrected the papers of the two groups and recorded the grades of the students of the two groups. The mean of the grades of the students of the two research groups and the standard deviation was calculated, and then the t-test was applied to two independent samples as shown in Table (7).

negative, and I found them to range between ({-0.05}, {-0.38}). This means that the wrong alternatives have distorted the weak students, which indicates the effectiveness of the wrong alternatives to the future thinking scale, and thus it was decided to keep the incorrect alternatives as they are.

4- **scalestability**

The stability of the future thinking scale has been verified, as the stability of the scale was calculated using the equation of (Alpha – Cronbach) because all its paragraphs are objective of the type (multiple selection), so the researcher also used this method to calculate the stability coefficient of the future thinking scale and found its stability coefficient equal to (0.96), which is a good stability coefficient, if the value of the stability coefficient from (0.67) and above is good. This is an acceptable stability coefficient, as indicated by researchers and workers in the field of psychological and educational

Table (7) arithmetic mean, variance, calculated T-value, tabular and degree of freedom for the students' scores of the research sample in the final associative thinking test

No.	group	Number of students	Arithmetic mean	standard deviation	Variance	Freedom degree	T value		Statistical significance at the level of 0.05
							Calculated	tabular	
1	Experimental group	62	31.27	4.23	17.91	118	4.852	2	Function
2	Control group	58	27.47	4.37	19.06				

a. The KUD strategy has helped to accustom students to cooperative work and provide assistance when needed, as well as enabling them to seek help when needed and make efforts to achieve the desired objectives.

b. Teaching in accordance with the KUD strategy is more influential than the usual way and students' confidence in themselves and their ability to achieve the activities and work required of them is increased

Answer: The KUD strategy helps students to accept the idea that the tasks and activities provided by the teacher to them are different, which is not a preference from the teacher, but rather to help students achieve maximum success.

Third: Conclusions : Based on the results that emerged, the two researchers concluded the following:

The above table shows that the average scores of the students of the experimental group in the future thinking test (31.27) and the standard deviation(4.23), while the average scores of the students of the control group (27.47) and the standard deviation reached (4.37), and using the equation of the T-test for two independent samples, it shows that the calculated T-value (4.852) is greater than the tabular value at the level of significance (0.05) and a degree of freedom (118), which is equal to (2). This means that the students of the experimental group are superior to the students of the control group in the scale of future thinking and rejection of the zero hypothesis and accepting the alternative hypothesis, that is, there is a statistically significant difference between the average scores of the experimental group and the average scores of the control group and in favor of the experimental group.

Second : Interpreting the results :

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Teaching according to the strategy (KUD) is positively effective in raising the level of achievement of physics subject for fourth grade students compared to the usual method.

Fourth: Recommendations: In light of the conclusions reached by the research, the following recommendations can be formulated: -

1- Directing teachers of scientific subjects in general and physics in particular to diversify the use of various strategies in teaching such as (KUD). For its role in achieving the objectives of teaching scientific subjects to raise the level of achievement.
2- Conduct in-service training courses for physics teachers to train them in the use of modern strategies, including KUD strategy.
3- The need for the Ministry of Education to issue a guide for physics teachers that includes modern strategies with an indication of the steps and mechanism that it carries out, and varied to keep abreast of developments in the educational process.
4- Include modern strategies, including (KUD) strategy, in the vocabulary of methods of teaching physics in faculties of education and basic education in order to improve and develop the level of preparation of the physics teacher.

Fifth: Proposals: Complementing this study, the two researchers propose to benefit from the strategy (KUD) in conducting a number of studies and scientific research as follows :

1-Conducting studies similar to the current study in the subjects of (biology – chemistry) and at other stages of study (primary and intermediate)

2.- Conducting studies to identify the impact of using the strategy (KUD) in biology in other dependent variables such as (trends – scientific thinking – motivation – science processes - formal thinking).

3.Conducting a similar study using a strategy (KUD) on middle school students, taking into account the gender variable.

4-Conducting research to compare KUD strategy with other teaching methods.

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