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The Effectiveness of The KUD Strategy in The Achievement of Second-Year Intermediate Students and Developing Their Inclination Towards Physics

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Abstract

The aim of this research is in order to identify the effectiveness of the KUD strategy in the academic achievement of second-grade intermediate students, and to change students' view towards physics, and the sample consisted of (83) students from the second intermediate grade in Tal Afar Intermediate School for boys for the academic year (2022-2023) for the second semester. The researcher has chosen this school deliberately because it contains more than four divisions, as well as the cooperation of the subject teacher and the school administration in the success of this experiment. The students were randomly divided into two groups, the first experimental group studied strategically KUD and the second control group studied in the usual way. As well as conducting equivalences for the two groups in (academic achievement of parents - intelligence quotient - chronological age in months - physics degree third grade intermediate - tribal inferential thinking). To achieve this goal, the researchers have prepared an achievement test, which consisted of (36) items, all representing a type of multiple choice and verified its validity and stability as well as its psychometric properties. The second tool is the measure of inclination towards physics, which consists in its final form of (20) paragraphs triple alternatives, and after analyzing the study data statistically using the T-test for two independent samples, the results showed the following: There is a difference y and statistical significance at the level of significance (0.05) between the average scores of the achievement test for the experimental and control groups and in favor of the experimental group. Secod, here is a difference y and statistical significance at the level of significance (0.05) between the average development of the tendency towards physics for the experimental and control groups and in favor of the experimental group.

Keywords: *Second Intermediate Grade, Kud Strategy, Achievement, Inclination.*

Introduction

Our current era, which is going on, is witnessing rapid technological and scientific developments that the individual has not recognized in its history, including science, especially physics. Physics has an effective role in these developments. Thus, we can say

that the revolution of technology and information that the twentieth century witnessed by going to the moon is due to the development in physics. As a result of this development, it has become one of the requirements of the era, making the learner aware of a reasonable amount of contemporary intellectual output in physics with its new content and organization. The science of physics is a comprehensive science that enters into all aspects of life, whether in daily use or in the creations of the arts of life that the learner tends to in all aspects that the learner will specialize in, as well as the scientific development that we are witnessing today and increases his achievement and access to satisfactory results. We have to follow and keep up with this science . (Al-Kubaisi and Abdullah, 2018: 7)

Therefore, it has become our duty for educational institutions to prepare and develop learners to serve the community and meet its diverse needs. This diversity is physics. They must also consider and develop study materials and curricula. Educational institutions must adopt modern methods and develop teaching methods, including the application of modern theories in teaching and moving away from old and traditional teaching methods. This is done by preparing educational courses for modern methods and modern teaching strategy for teachers and giving modern and diverse strategies. The role of the teacher in selecting these methods remains in accordance with the nature of his learners and what corresponds to the objectives to be achieved in the content he deals with .The teaching method is an effective element for the success of the educational process, especially one that emphasizes and cares for the active participation of learners in the classroom, thus making the learner a positive element in the academic community. (Kazim, 2021: 8)

The educational-learning process and its various means are a modification of human behavior through the objectives contained in the curricula because they determine the educational objectives that are hoped to be achieved by learners . From this aspect and reason, we see that most of the science teachers are looking for the best methods and strategies that contribute to arranging and organizing the curriculum experiences and delivering it to the learners with more benefit, appropriate time and lower cost. In addition, the most important modern theories, the most prominent of which is the constructivist theory, which is one of the latest in the art of teaching and its methods, as the focus shifts according to its principle from the external factors that affect the learner's learning, including the teacher's variables about his personality, style, etc., as well as the school, the curriculum, etc., and the inclination towards the material is one of the factors so that this interest and focus turn to the internal factors that have an impact on this learning . (Adwan and David, 2016: 13)

One of the methods and strategies that rely on active constructive learning is the kud strategy, which is one of the important strategies for science teachers. This is a strategy that requires the teacher to prepare seriously for the class and prepare all the methods of assignment for students based on a precise knowledge of the individual

differences between them and the content and objectives and increase the achievement of the material and their inclination towards it.(Al-Maqdisi 2019 1)

To achieve this strategy, we must focus on scientific concepts, as it indicates that they are the important building blocks of science curricula and that knowledge of concepts and knowledge of them are also among the objectives of science teaching, because they focus on mental activity and increase their inclination in which the cognitive representation of previous experience and the components of science and scientific material are organized together in order to reach the planned goal. (Afana et al., 2010: 88).

It has been noted that the teaching of physics scheduled in our schools, especially in the intermediate stages, has a clear weakness in the students' abilities to understand the concepts and their desire for the content of the subject, as well as the weakness of interaction with them effectively. The reason for this is that the curriculum and its content are still restricted to the usual methods of teaching that are outdated, eating and drinking, which focus on the aspect of memorization and memorization and overlook the aspect of understanding for the purpose of obtaining high achievement in the examinations. The ones that are directly saved by us disappear soon after the examinations are completed because the student did not associate him with his cognitive structure and conceptual checks and reduces the desire and inclination to take science from scientific materials.

The trends of developed countries are oriented towards the development of science and education, including active learning to obtain convincing and productive results. The need to keep pace with everything new in the educational field requires those in charge of the educational process not to adhere to methods and strategies based on diction and preservation and break the desire of students towards the scientific material because it is no longer sufficient to meet the requirements of the educational process, nor able to achieve the desired educational objectives that emphasize the development of all aspects of the learner's personality. (Munis 2012: 13)

The adoption of methods and methods as well as modern strategies in teaching materials has become a reality and imposed, including the importance of creating a state of balance between educational requirements, and because of the importance of this, new and modern strategies are being built that increase the achievement and thinking of students at the same time. Educational institutions in many countries of the world have adopted an educational philosophy based on increasing attention to the thinking of students at various stages of education and calling them to move away from the traditional pattern in the teaching process, which is based on stuffing the minds of students, knowledge and educational information, which led to a low level of study and achievement and their inclination towards materials and also transforms and develops their higher stages of thinking in describing the field of knowledge and education .(Al-Kubaisi, 2016: 22)

With a realistic look at the teaching of science topics, especially physics, the two researchers conducted an exploratory study of a group of middle and secondary schools for boys in the city of Tal Afar if he directed an exploratory questionnaire to a group of

teachers of science and physics, as the research and study resulted in teachers following traditional and usual methods that emphasize theoretical aspects without students having any actual contributions to educational situations. Teacher indoctrination, memorization and memorization on the part of students, which leads to boredom, boredom and unwillingness of study materials and without achieving the desired educational and educational objectives, as well as the lack of use and knowledge of most teachers of modern and effective teaching models and strategies in teaching physics, which leads to students' weakness in achieving physics and lack of desire and inclination towards scientific materials, as well as their practice of general thinking skills and obtained high grades.

Therefore, it is necessary to search for modern strategies and methods in teaching as well as modern and developed methods that raise the suspense in a study period, as well as stimulate their thinking, increase them and their inclination towards the subject and increase their achievement is necessary. The two researchers decided to use the (kud) strategy in order to contribute and stimulate raising the achievement level of students and their desire for the subject. Hence, the problem of the current research can be identified by answering the following question: What is the effectiveness of the kud strategy in achieving the second intermediate grade students and developing their inclination towards physics?

These days, our world is witnessing a rapid movement of developments in various fields in technology and science, and this development is accompanied by an explosion of identifiers that does not stop in a sophisticated and rapid manner so that the student is in very urgent need of learning and strives to adapt to modern information and link it with future developments as well as living with life in a positive manner and is able to adjacent to the huge amount of scientific information. He must work hard and think systematically in order to choose the most appropriate alternatives and solutions that push society to move forward to achieve civilization, progress and rapid development. (Cream, 2008: 2)

Thus, the use of appropriate teaching methods and strategy in education, the subject of physics, makes it an easy and smooth subject and understanding the inclination of students and the liking of the subject to them from this context must be eliminated and away from the methods of methods that lead to boredom of education because it leads to the lack of desire of students in the subjects of the lesson and reduce their educational problems and increase their achievement . (Rashid 1996: 114)

The spring study confirms that "training teachers, teachers and learners on the use of modern strategies in science education has a great impact on increasing the ability of learners to discover thinking and communicate well with teachers and each other and thus increase their academic achievement and inclination towards the subject." (Spring, 2016: 4)

It also became clear to the researchers through his frequent visit to middle and secondary schools after watching middle school students in schools in Tal Afar and

reviewing the record of grades of students in the second grade in science and physics and discussing this with teachers that most teachers follow the usual methods in teaching science and physics in particular, as most teachers or teachers are not interested in linking the theoretical and applied side with the neglect of many of them for effective teaching methods, strategies and models, which led to a low level of achievement in science as well as the unwillingness of students to continue teaching and their inclination towards science and physics.

Therefore, the two researchers decided to choose the kud strategy, which is one of the strategies of active constructionism, and to identify its impact on achievement, development and their inclination towards physics. The significance of the current study can be summarized as follows

1. The importance of the (kud) strategy in teaching physics as one of the modern strategies within the strategies of active constructive learning.
2. The importance of physics and science, its phenomena, its relationship with other materials, its connection with daily life and natural phenomena, as well as its laws and mathematical and computational problems.
3. The importance of intermediate and secondary stages in general, and the second is intermediate in particular. It is one of the classes that are important for the student for the scientific trend, and students need to stimulate their activity, organize their ideas and teach them modern teaching methods that make them a primary focus and increase their achievement and ownership towards scientific subjects in the education process.

Method

The current research aims to identify the effectiveness of the kud strategy in achieving the second intermediate grade students and developing their inclination towards physics. There is no statistically significant difference at the level of (0.05) between the average achievement of the students of the experimental and control groups. There is no statistically significant difference at the level of (0.05) between the average development of the inclination towards physics for the students of the experimental and control groups. Human limit Second Grade Intermediate Students, spatial Tal Afar Middle school for Boys, Nineveh Governorate, Tal Afar District. Chronological academic year 2022 – 2023. Objectivity strategy (kud), achievement, their inclination towards physics.

KUD Strategy

Kud strategy (Know, Understand, Do:) was defined by Tomlinson(2001) defined it as: "Reorganizing what is going on in the classroom so that learners have multiple options for accessing information, building meaning for ideas, and expressing what they have learned." (Tomlinson, 2001:1). Defined by Ziebell (2002): It is a teaching method in which the teacher provides multiple entries that meet the different needs of each learner in the

classroom in order to work to release the highest amount of knowledge they have " (Ziebell, 2002:2)

It is one of the strategies of modern constructionism that cares about the student and revolves around him and looks at the individual differences between one student and another and cares about what students need from the desires and inclinations in a variety of ways. It contains a set of steps that make the student an active recipient while the teacher instructor, which includes dividing students into small cooperative groups. The scientific material is presented by showing pictures illustrating it to him to know it first and then distributing the educational activities of the scientific concept, and the students' awareness of the meaning of the scientific concept.

Rafah was identified by Allam (2000): "The degree of acquisition achieved by the learner or the level of success he achieves reaches him in a specific subject."(Allam, 2000: 55). Qamish et al. (2001): "The level of skill acquired by the learner as a result of a specific subject, study or educational unit" (Qamish, 43:2001). Procedurally, the researchers define achievement the result of what the students of the second intermediate grade learned from a subject in physics according to the textbook scheduled after they were taught according to the strategy of (Kud) through the duration of their subjecting to the research experiment and expressed in the grades obtained by the students through an achievement test prepared by the researchers for this purpose .

The two researchers identified the Inclination towards physics procedurally it is the desire of the students of the second intermediate grade and the size of their interest in reading, reading and researching about physical topics as well as scientific activities and following up the practical fields in which physics enters. This is measured by the degree obtained by the students within the scale of inclinations towards physics prepared by the researchers for this purpose .

Theoretical Framework

One of the strategies of constructivist theory in teaching is the (kud) strategy, which was developed by Dr. Carol Ann Tomlinson, Associate Professor of Educational Leadership, Curry College of Education, University of Virginia, 1999 . This strategy focuses on teachers' expectations towards learners in terms of the direction and ability they have, as well as the way the teacher follows. There is no specific strategy that is good or not good. Educational strategies are like containers for conveying content and information to learners. However, there are some vessels that are better than others to achieve certain objectives (Tomlinson, 2005: 16).

Stages of a strategy (kud) first, (K) means (Know) knowledge at this stage, students need to know the vocabulary, facts, concepts, definitions, places, and information at first glance. Knowledge is the basis for understanding students and thus they turn from passive marginal to active and active. Knowledge is also one of the doors of study and research that deepens the knowledge of students (Qatami, 2013: 135). Second, (U) Understand In this step, students need to understand the facts, principles, generalizations, and rules

within a specific field of knowledge. Without understanding, students cannot exercise their advanced-level mental abilities of applying, analyzing, synthesizing, and evaluating . (Al-Rubaie, 2015:31).

Third, (D) means (Do) the solution In this step, students must apply what they have learned and understood within new educational situations and this comes through their use of communication skills, thinking and good planning for that . (Khutaybah, 2005: 56). Principles underpinning the Kud strategy: 1. The teacher should take a broad and deep idea of everything that is essential in the educational subject; 2. The teacher is interested in the individual differences between his students and focuses on them and creates his steps on them. 3. The process of education and evaluation are parallel; 4. All students must participate in the learning process; 5. Students and their teachers are partners in the learning process; 6. The essential thing is to achieve success for every learner; 7. The distinguishing characteristic is flexibility.; 8. The teacher changes (knowledge, understanding and outcomes) according to the learners' readiness, inclinations and teaching style (Al-Rubaie, 2015:33).

Assumptions underlying the Kud strategy: 1. There are no learners who are equal in their intellectual abilities, abilities or talent and they are different in their environments and thus they are unequal in their learning methods and the degree of response to them. 2. The Kud strategy provides a suitable educational climate for all learners because it is based on the idea of diversifying activities and tools, thus enabling each learner to achieve the desired objectives . 3. Teachers cannot achieve the same standard for all students using a traditional teaching method. (Attia, 2009: 24).

The role of the teacher according to (Kud) strategy: 1. The teacher must take into account the individual differences between learners; 2. It is concerned with periodically following up the content, process and outputs according to the strategy; 3. The need for the teacher to be flexible with the learners; 4. The teacher tries to identify the inclinations, abilities and learning styles of the learners to help them identify the activities; 5. The teacher is the one who has the task of facilitating the teaching of his students; 6. At the beginning of the use of the (Kud) strategy in the study, the teacher should explain this to the learners and inform them of its details so that the strategy achieves its desired objectives. (Nasr, 2014: 82).

The role of students according to (Kud) strategy: 1. Build the student's self-confidence and potential by achieving the required work and activities; 2. Spreading the spirit of teamwork and providing assistance when needed. It also enables the learner to ask for help whenever necessary to achieve the objectives; 3. Each student must have a variety of tasks and activities, and the teacher must contribute effectively to achieving this to take into account the various characteristics of each student; 4. Actively contributing to the diversification of evaluation methods for students and working to maintain and continue them to reveal the different capabilities of students and achieve the desired objectives in this regard . (Sponsor, 2014: 41).

Kud Teaching Steps: The teacher should follow the following steps: 1. Know The teacher gives the scientific concept to the students through the definition, which is to display pictures or models in it; 2. Step 2 Understand The teacher provides multiple educational activities for groups such as drawing a painting, making a story or discussion in a magazine or a representative scene that talks about the scientific concept to be learned, and allowing students to present their questions and enrich them with feedback. 3. Do At this stage, the teacher reveals the extent to which learners perceive the meaning of the scientific concept through activities in a specific project, solving problems, writing short reports, wallcharts, or conducting laboratory experiments as support for their learning. (Zayer et al., 2013: 72).

The steps of the strategy can be summarized as follows: 1. Pre-training assessment: It is a pre-training procedure through which the teacher learns about the knowledge backgrounds and levels they possess so that he can later distribute tasks and activities to them; 2. Set learning objectives; 3. Organize the learning environment in a way that all groups interact with; 4. Distribute the activities provided to each group; 5. Provide instructional tasks, materials, and appropriate learning resources; 6. Conduct a post-evaluation process to measure learning outcomes; (Tomlinson, 2001:44) The researchers

believe that the practical steps of the Kud strategy can be as follows:

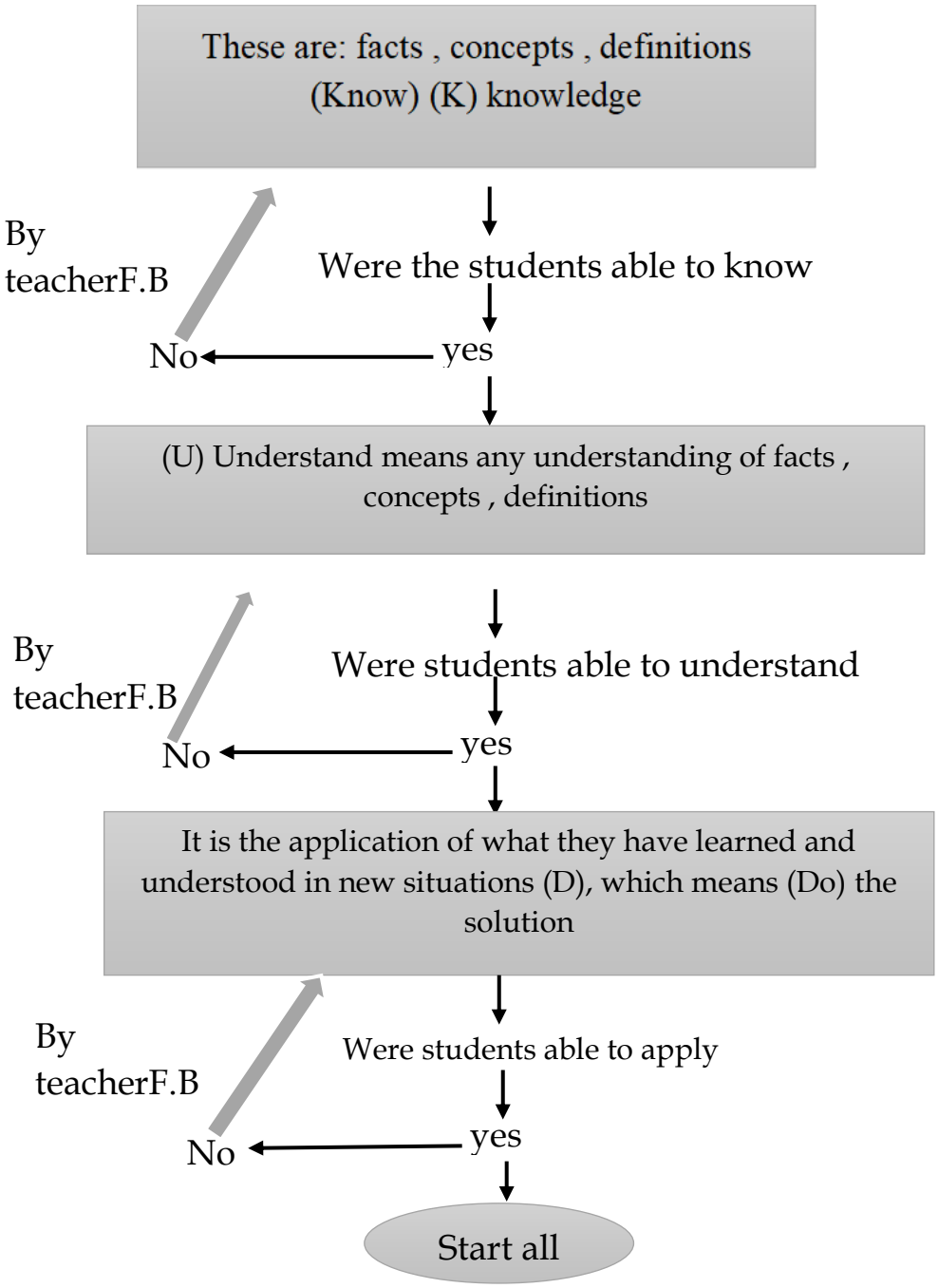

Chart 1. Application steps for the (Kud) strategy prepared by the two researchers. Second: Scientific inclinations. Despite the importance of scientific inclinations and their development and taking a prominent place in scientific education and science teaching,

there is a scarcity of research and studies that tried to identify the levels of scientific inclinations among students at various educational stages. (Al-Sabbagh,1996: 55).

Scientific inclinations have a prominent role in the lives of students and the formation of their scientific personalities. In addition, the behavioral elements that make up scientific inclinations are of particular importance to the student in that inclinations lead to the active participation of students in the educational-learning process. It is what students care about and prefer in terms of things, activities, studies, and what they do in terms of scientific work and activities that are beloved to them. (Olive, 1987: 163) Scientific inclinations are characterized by the following: 1. An individual's personal behavioral inclination to gravitate towards an activity. 2. It is associated with behavior as the student who has scientific inclinations is expected to practice his inclinations in different types of sciences and their activities. 3. A great sense of satisfaction that gives the student in achieving his desired objectives. 4. The individual may have scientific inclinations towards a certain activity but does not have the mental abilities to achieve it (Abdulhadi, 2002: 44).

Behavioral components of scientific inclinations: 1. Filling spaces with various activities such as: (hobbies, making boards, making devices). 2. Freely dive into scientific readings and explore scientific issues. 3. Follow up and join scientific societies and clubs. 4. Discussing and raising scientific topics. 5. Collect models and samples from the environment. 6. Paying attention to laboratory work and its scientific activities. (Zeitoun, 2004: 44).

Search Procedures

In light of the objective of the research, the researchers adopted the experimental approach according to the following steps: The two researchers adopted the experimental design with two equal groups, one of which is the experimental group, which was taught according to the kud strategy, and the other is the control group, which was taught in the usual way as in Figure (1).

Groups	Pre-test	The independent variable	Post-test	Dependent variable
Experimental group	Inclination towards Physics	kud strategy	Achievement Inclination towards Physics	Summative assessment
Control group		The usual way.		Inclination towards Physics

Figure (1) Experimental design

Second, identifying the research community. The current research community is determined by all (2250) students of the second intermediate grade for the daytime study in public schools, who are continuing their studies in secondary and middle school s in the city of Tal Afar for the academic year (2022-2023), and the number of (33) schools Third: Selection of the research sample.

After the research community was selected by the researchers from the second intermediate grade students and the researchers obtained their information as well as the number of academic divisions, the Tal Afar medium for boys was selected, which achieves the research goal and is in line with the experimental design. Therefore, the Tal Afar medium for boys was chosen intentionally to implement the experiment for the following reasons: 1. The cooperation of the school administration with the two researchers; 2. The subject teacher cooperated with the two researchers to implement the experiment; 3. It contains more than four academic divisions; 4. The location of the school in the center of the city and its presence of students at different levels.

After the researchers randomly distributed the students of the division in the school into two experimental and control groups, and their number reached (83) students after excluding the repeaters by two students for each group. Fourth: Equivalence of the two research groups. Before proceeding with the implementation of their experiment, the two researchers were keen to statistically conduct parity for the students of the two research groups in some of the variables that the two researchers believe may affect the integrity of the experiment despite the random distribution of the sample students, as well as the fact that the sample students are from close residential areas and study in one school and the same gender. These variables are: IQ level; Chronological age in months; First Grade Intermediate Physics Score; Grade 1 GPA Intermediate; Tribal Physics Inclination Scale

Table 1. Equivalencies of the research sample

S/N	Variable	Group	Number	Mean	Standard Deviation	Calculated t value	Tabular t-value	Sig
1.	intelligence quotient	Experimental group	43	45.30	6.33	0.88	2.0	Non Significant
		Control group	40	44.13	5.89			
2.	Age in months	Experimental group	43	159.35	9.34	0.19		
		Control group	40	158.93	10.51			
3.	Physics Degree	Experimental group	43	72.49	10.12	1.05		
		Control group	40	70.35	8.32			
4.	Overall Average	Experimental group	43	72.05	7.97	0.62		
		Control group	40	70.95	8.02			
5	Upper inclination scale	Experimental group	43	45 – 65	3,639	0.45		
		Control group	40	46	3,394			

Fifth: Research Requirements. One of the requirements for applying the experiment is the following:

1. Determining the scientific subject: The two researchers identified the scientific material, which is the second and third units of the second part of the science textbook to be taught for the second intermediate grade of the second unit, the fourth semester was selected for simple machines, and from the third unit, the fifth semester was selected for the wave movement for the academic year (2022-2023)
2. Choice of Teaching Plans. The two researchers prepared two models for two teaching plans, the first according to the (kud) strategy of the experimental group and the second is a regular plan for the control group, and the number of teaching plans reached (16) plans for both groups .
3. Formulation of behavioral objectives. The two researchers formulated behavioral objectives in terms of the vocabulary included in the experiment according to Baum's classification of the cognitive field limited to the levels (remembering – absorbing – applying) . In its final form, it reached (40) behavioral objectives, and it was presented to a group of arbitrators in the field of teaching methods, and it obtained an agreement rate of 80%, so they were all approved.

Sixth: Research tools, first Building an achievement test. The current research required the construction of a tool to measure the variable dependent on achievement. The following are the steps followed by the two researchers in this regard: 1) Identify the scientific material and determine the content of that material as well as formulate behavioral objectives . 2) Building the item s of the achievement test, which consists of (36) item s in their final form for the chapters covered by the research and that this number is appropriate for the test taking into account the individual differences after the researchers took the opinion of the physics teachers for the second intermediate grade to determine the number of test item. 3) Prepare the test map and specification table. 4) Set Test Correction Instructions

Second: Poll application of the test. In order to ensure the clarity of the item s and its instructions and to determine the time of the test, it was applied to an exploratory sample of (40) students from the second intermediate grade at the Arab Unity High School for Boys in Tal Afar on Tuesday 28/2/2023. After applying the test, it became clear that the instructions were clear and that the time taken to answer was (40) minutes, as the time taken was calculated through the following equation.Response time for the first student = 34 minutes. Response time for the last student = 46 minutes. Average time= 34 + 46 / 2 = 80 / 2 = 40 minutes.

Third: Statistical Analysis of Test Items. The researchers applied the achievement test to the sample of statistical analysis from the second intermediate grade students in order to find both: 1) Summative assessment. 80% was adopted as a criterion for the acceptance of item s or not in the light of what the experts expressed from their observations, and therefore all item s of the test obtained this percentage after making amendments to a number of them in terms of wording and content, thus achieving the

validity of the test. 2)Test Item Difficulty Coefficient.To achieve the difficulty coefficient, the two researchers used the difficulty level equation after the two researchers applied the achievement test to the statistical analysis sample on Thursday 2/3/2023. It was found that the level of difficulty of the item s ranges between (0.41 – 0.78) for all the test items and thus the test is good and valid . If the difficulty coefficient of the item s ranges between (0.20-0.80), they are considered acceptable item s (Chalabi, 2005: 33).

3) Vertebrae Recognition power for Test. To extract the differential strength coefficients and to judge their validity, the two researchers analyzed the test item s by selecting an exploratory sample from the research community consisting of (40) students from the second intermediate grade on Thursday 2/3/2023. After arranging their forms into two upper and lower groups, the differential strength of the item s ranged between (0.31 – 0.76). The item s are considered acceptable and when their degree of differentiation increases from (0.20). 4) Effectiveness of Wrong Alternatives**.** In order to verify the effectiveness of the alternatives to the objective item s, the researchers analyzed the response of the members of the exploratory sample to the objective item s in order to find the effectiveness of their alternatives. The equation was applied, as the calculated percentages of those alternatives indicated that they are negative and less than (-0.04). This indicates that all these alternatives to the objective item s are camouflaged and attractive to the members of the lowest category of the exploratory sample.

Achievement Reliability

The two researchers adopted the Cronbach Alpha method to extract this reliability by applying it to an exploratory sample of (30) students from the second intermediate grade in Al-Ghazali Middle school for Boys in Tal Afar on Sunday 5/3/2023, where the value of reliability reached (0.82), which is high reliability, and thus the achievement test is ready to be applied to the basic sample after verifying its validity and reliability. Second: the scale of inclination towards physics.One of the requirements of the current research is to build a measure of the inclination towards physics, and it has gone through the following steps.

Validity of the scale. The researchers adopted a percentage of (80%) as a criterion for the acceptance of item s for the scale or not by presenting it to a group of experts in the field of educational psychology and teaching methods. All these item s obtained this percentage after making amendments to them in terms of wording and content, thus achieving the validity of the scale. Vertebrae Recognition power for Physics Inclination Scale. To extract the discriminatory strength coefficients and judge their validity, the researchers statistically analyzed the item s of the scale by selecting an exploratory sample from the research community consisting of (100) students from the second intermediate grade on Sunday 27/11/2022. After arranging their forms into two upper and lower groups, the discriminatory strength of the item s ranged between (0.34 – 0.72), as (Chalabi, 2005) indicated that the item s are considered statistically acceptable when their degree of discrimination increases from (0,20).

Reliability of The Scale Of Inclination Towards Physics

The two researchers adopted the retesting method to achieve the reliability of the scale, as it was applied to a survey sample consisting of (50) students from the second intermediate grade in the city of Tal Afar on Wednesday 30/11/2022. After two weeks, the scale was re-applied to the same sample and using the Pearson equation, the value of the reliability was (0.84). Thus, the scale was ready in its final form consisting of (20) triple-alternative item s to be applied to the basic sample after its validity and reliability were verified.

Seventh: Implementation of the research experiment. After selecting the research sample and distributing it into two groups that are similar in social and cultural characteristics, as well as preparing two models of teaching plans for both groups, the researchers carried out their experiment by assigning the science teacher in the school to carry out the experiment starting from the second semester of the academic year (2022-2023) of the physics subject prescribed from the second part of the science textbook for the second intermediate grade 2020 edition. The researchers were monitoring the progress of work and the experiment continued for a full semester starting from Monday 13/3/2023 to Wednesday 10/5/2023.

Eighth: Application of search tools. After the implementation of the experiment was completed on Wednesday 10/5/2023, the two researchers applied their tools to the post-achievement test and the post-physics inclination scale to the individuals of the basic research sample on Thursday 11/5/2023 with the help of the subject teacher in Tal Afar Middle school for Boys . The forms were corrected by the two researchers by giving one for the correct answer and zero for the wrong, abandoned or indicated answer more than one alternative to the achievement test. The score of the achievement test ranged from 0 to 40 . As for the scale of inclination towards physics, the three alternatives ranged in degrees (zero is the lowest degree, the average is 40 degrees, and the highest is 60 degrees) .

Results and Discussion

This part includes the results obtained by the two researchers in light of their hypothesis and then discuss them as follows: First: Results related to the first null hypothesis " There is no statistically significant difference at the level of significance (0.05) between the average achievement of the students of the experimental and control groups "To verify this hypothesis, the researchers extracted the arithmetic mean and the standard deviation of achievement for the members of the experimental and control groups of physics, and then according to the t-test for two independent samples. The results are listed in Table (2)

Table 2

Group	Average	Standard Deviation	Calculated t value	Tabular t-value	degree of Freedom	Sig

Experimental group	34:05-	5.88	2.75	2	81	Significant
Control group	29.18	9.66				

It appears from Table (2) that the value of (t) calculated (2.75) is greater than its value at the significance level of (0.05), which is equal to (2.0), and this indicates that there is a statistical significance between the means of achievement of the experimental group and the control group and in favor of the experimental group. To reveal the size of the effect of the experimental variable in the dependent variable (achievement) in physics, the researcher applied the ETA equation (M2), which amounted to (0.085), and then the researcher extracted the size of the effect, which amounted to (0.305), which indicates that there is a noticeable effect of the independent variable on the dependent variable.

First: Results related to the second null hypothesis " There is no statistically significant difference at the level of significance (0.05) between the average development of the inclination towards physics for the students of the experimental and control groups". To verify this hypothesis, the researchers extracted the arithmetic mean and the standard deviation of achievement for the members of the two groups of physics subjects and then according to the t-test for two independent samples. The results are listed in Table (3)

Table 3.

Group	Average	Standard Deviation	Calculated t value	Tabular t-value	degree of Freedom	Sig
Experimental group	2.625	3.394	4.16	2	81	Significant
Control group	5.419	2.639				

It appears from Table (3) that the value of (t) calculated (4.16) is greater than its value at the significance level of (0.05), which is equal to (2.0), and this indicates that there is a statistical significance between the averages of the development of the inclination of the students of the experimental group and the control group and in favor of the experimental group. The researchers also extracted the arithmetic mean to develop the upstream and downstream inclination for the experimental and control groups and to find the difference between them and to find the arithmetic mean and standard deviation of the difference between them. The inclination and its results were included through two tables (4)

Table 4. Inclination (control before and after)

Group	Arithmetic average	Difference	Standard Deviation of Difference	Calculated t value	Tabular t-value	degree of Freedom	Sig
Before	46	2.625	3.394	4.89	2	39	Significant
after	48.63						

It appears from Table (4) that the value of (t) calculated (4.89) is greater than its value at the level of significance (0.05), which is equal to (2.0), and this indicates that there is a statistical significance among the control sample, meaning there is development.

Table 5.Tilt (experimental before and after)

Group	Arithmetic average	Difference	Standard Deviation of Difference	Calculated t value	Tabular t-value	degree of Freedom	Sig
Before	45.65	5.419	2.639	13.47	2	42	Significant
after	51.07						

It appears from Table (5) that the value of (t) calculated (13.47) is greater than its value at the level of significance (0.05), which is equal to (2.0), and this indicates that there is a statistical significance among the experimental sample, meaning there is development.

Result Interpretation

After presenting the result in Table (2) and the size of its impact, as well as presenting the result in Tables (3), (4), (5) . The two researchers agree in their interpretation with the performance said with the opinion that the (kud) strategy is one of the modern strategies in teaching, as the strategy focuses on making the student a basic focus of the educational process by giving the scientific concept in various forms and providing various activities during the lesson and applying what they learned and understood by students within new educational situations.

It can be said that the process of acquiring materials is one of the main objectives that educators in the field of education seek to achieve through different educational situations for all stages, and that their interest in acquiring and learning them is consistent and homogeneous with the nature of this era, which represents the era of technology, the Internet and globalization, which is difficult for the student with the huge amount of information. For the purpose of raising the student's achievement, traditional methods of teaching must leave and come up with an educational strategy based on constructive and active learning, which makes students want to change their convictions towards scientific subjects, especially physics, because the (kud) strategy works to detail knowledge as well as to inform students of various sources to increase their understanding, which deepens students' self-confidence towards presenting their ideas freely and increases their desire towards continuing the scientific subject.

In light of the above, the researchers believe that this strategy has generated in the students the desire to cooperate and investigate through their work in cooperative groups, which contributes to increasing research, exploring physical concepts, exchanging views among them and sensing the spirit of challenge and responsibility, which is reflected positively in their achievement, desire and inclination towards physics.

Conclusions

Based on the findings of the research, the two researchers draw several significant conclusions. First and foremost, they posit that there is a viable prospect for implementing the KUD (Know, Understand, Do) strategy in the teaching of science and physics. This suggests that the KUD strategy exhibits potential as an effective pedagogical approach for imparting knowledge and fostering understanding in these academic domains. Furthermore, the researchers observe that the utilization of the KUD strategy contributes to a notable enhancement in students' cooperative behavior. The strategy not only encourages collaboration among students but also correlates with an overall improvement in their educational achievements. This dual impact underscores the social and academic benefits of employing the KUD strategy within the educational context.

Additionally, the researchers note that the KUD strategy has a positive influence on students' inclination and enthusiasm toward scientific subjects and physical concepts, specifically for the second intermediate grade. This implies that the strategic implementation of KUD principles in teaching can potentially cultivate a heightened interest and motivation among students in these particular academic disciplines during their second intermediate grade. In summary, the researchers assert that the KUD strategy holds promise for effective teaching in science and physics, fosters student cooperation, and positively impacts students' interest and enthusiasm for scientific subjects and physical concepts, particularly in the context of the second intermediate grade. These conclusions collectively advocate for the integration of the KUD strategy as a valuable tool in educational practices.

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