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The Effect Of The Perkins' And Blythe's Model On Mathematical Communication Among Students Of The 5Th Bio Scientific Grade In Mathematics

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Abstract

The aim of this research is to identify ((the effect of the Perkins' and Blythe's model on mathematical communication among students of the 5th bio- scientific grade in mathematics)). By verifying the following hypothesis: There was no statistically significant difference (0.05) between the average scores of the experimental group who studied according to the Perkins's and Blythe's model and the average score of the control group students who studied according to the usual method of mathematical communication. For the purpose of achieving the goal of the research, the researchers has the following: 1. Prepare instructional plans according to the Perkins and Blaith model steps for the experimental group and others according to the usual method of the control group. 2. Adopting the mathematical communication test prepared by Zina (2013) in a previous study after it was adapted to the students of the research sample by presenting it to some of the arbitrators, which consists of (17) paragraphs. To achieve the research objectives, one of researchers applied the experiment and tested the mathematical communication on a sample of his research which reached (66) students of the 5th bio scientific grade in the preparatory (Mahmoudiya scientific boys) distributed in a simple random way between the experimental and control groups (34) students in the experimental group And 32

in the control group for the academic year (2018 - 2019). The two groups were rewarded with (age of time, previous collection of mathematics, intelligence and mathematical communication). The data were then analyzed using the TI test of two equal independent samples, the results showed a statistically significant difference at (0.05) between the average scores of the experimental group and the average score of the control group students in the sports communication test and for the experimental group

In light of the findings of the researchers, they made a number of recommendations and proposals for research and study.

El Efecto Del Modelo De Perkins Y De Blythe En La Comunicación Matemática Entre Estudiantes De Quinto Grado Biocientífico En Matemáticas

Resumen

El objetivo de esta investigación es identificar ((el efecto del modelo de Perkins y Blythe en la comunicación matemática entre estudiantes de quinto grado biocientífico en matemáticas)). Al verificar la siguiente hipótesis: No hubo diferencias estadísticamente significativas (0.05) entre los puntajes promedio del grupo experimental que estudió de acuerdo con el modelo de Perkins y Blythe y el puntaje promedio de los estudiantes del grupo control que estudiaron de acuerdo con el método matemático habitual. comunicación. Con el fin de lograr el objetivo de la investigación, los investigadores tienen lo siguiente: 1. Prepare planes de instrucción de acuerdo con los pasos del modelo de Perkins y Blaith para el grupo experimental y otros de acuerdo con el método habitual del grupo de control. 2. Adoptar la prueba de comunicación matemática preparada por Zina (2013) en un estudio anterior después de que se adaptó a los estudiantes de la muestra de investigación presentándola a algunos de los árbitros, que consta de (17) párrafos. Para lograr los objetivos de la investigación, uno de los investigadores aplicó el experimento y probó la comunicación matemática en una muestra de su investigación que alcanzó a (66) estudiantes del 5to grado biocientífico en la preparación (muchachos científicos de Mahmoudiya) distribuidos de manera aleatoria simple entre los grupos experimentales y de control (34) estudiantes en el grupo experimental Y 32 en el grupo de control para el año académico (2018-2019). Los dos

grupos fueron recompensados con (edad, colección previa de matemáticas, inteligencia y comunicación matemática). Luego, los datos se analizaron utilizando la prueba de TI de dos muestras independientes iguales, los resultados mostraron una diferencia estadísticamente significativa en (0.05) entre las puntuaciones promedio del grupo experimental y la puntuación promedio de los estudiantes del grupo de control en la prueba de comunicación deportiva y para el grupo experimental A la luz de los hallazgos de los investigadores, hicieron una serie de recomendaciones y propuestas de investigación y estudio.

Research problem

Through the modest experience of the researchers in the field of teaching mathematics in junior high schools and through reviewing a number of research and studies conducted in the field of teaching mathematics, in addition to the confirmation of many teachers of mathematics and students of the fifth scientific biology on the most important difficulties faced in mathematics, the researchers noted that There is a general feeling among students, parents and a number of teachers that there are difficulties experienced by students in teaching mathematics, which focuses mostly on the difficulty of the mathematics course and its inadequacy for students' abilities. Because mathematics is transmitted through symbols, oral and written communication about mathematical ideas is usually not seen as an important part of its education, and as learners progress through classes, the mathematics they express becomes more complex and abstract. Their stock of tools and methods of communication as well as their mathematical thinking that supports their communication becomes more complex. Therefore, the majority of mathematicians find it incomprehensible, because they do not know of mathematical terms but read it in the lesson. Often, some learners are assigned to read a problem or operative theory and the focus is on mathematical procedure in proving or solving written problems. The reluctance of the learners to present their ideas to others is the perceived weakness in communicating the quality of the written and verbal language. (Sire, 108: 2009)

The researchers believe that the problem of research is determined by the following question ((What is the impact of the strategy of Perkins and Blyth on the mathematical communication of students fifth scientific biology))?

research importance

Recent trends in the teaching of science and mathematics emphasize the

need for the teacher to use modern strategies, methods and methods capable of improving students' understanding of scientific concepts and the development of their thinking, and develop their dealings with the variables in the surrounding environment, and keep abreast of the tremendous developments in the field of teaching on which the educational process is built. (Fiancee, 2008: 20)

In light of recent trends in teaching, it is noted that teaching methods are one of the most important pillars of building the curriculum and are directly related to the content structure. If the teacher can choose the appropriate method for the content scheduled, there is no doubt that it will achieve great success in the delivery of information to learners, because the development of learners' thinking is achieved by curricula Especially the development of thinking, or through multiple curricula, ie, the development of thinking is the way in which these curricula are taught so that these curricula are presented in a way that helps to develop the thinking of the learner. (Said, 2005: 86)

The language of mathematics is characterized by a high level of abstraction, it uses symbols instead of ordinary vocabulary, because it is a language based on symbols, and the ability to use symbols is one of the gifts that are unique to man. (Citrus, 62: 2002)

The language is used to communicate with others, where it requires learning symbols, signs and mathematical terms, and the language of mathematical clarity and accuracy, and is thus a global language that transcends borders between cultures and multiple languages. (Abu Zeina and Ababneh, 18: 2010)

This language has an important function of communication, and the subject of communication through which is known as mathematical communication, ie communication in the language of mathematics, and the subject of communication is either mathematical when the language of mathematics on a mathematical topic, or non-mathematical when we communicate in mathematics language on a subject in another area such as the economy used in So some mathematical vocabulary numbers, averages and percentages. (Mahmoud and Bakheet, 141: 2006)

With mathematical communication learners can organize and enhance their thinking and communicate their mathematical ideas in a coherent and clear way to their colleagues and teachers, so it is important to know the skills of mathematical communication to be able to use symbols in the representation of mathematical situations differently, and read mathematical texts with understanding. (Freih, 2011: 403)

With tremendous scientific development, and the continuation of scientific research, scientific knowledge is greatly increased, branching and diversifying, and therefore there is difficulty in transferring and teaching to students, therefore, educators focused on the acquisition of scientific concepts as one of the most important goals of teaching science, because it is the language of science and the key to scientific knowledge, and pointed out most Studies indicate that scientific concepts in general and mathematical concepts in particular are taught in a way that requires abstract thinking. This leads to difficulty in learning and collecting these concepts, so many studies have been conducted to develop appropriate treatment for the difficulties of learning these concepts. (Khawaldeh, 2003: 87)

In the second half of the last century, great efforts were made in the search for new theories and models of learning, and the theory of constructive learning and teaching models on which it was built was most acceptable to educators. (Yager: 1991,53)

Many models and educational strategies have emerged based on the constructivist theory, which focus on building the knowledge of the learner and revealing the previous knowledge he possesses, and confronting the learner with challenging educational situations and encourages competition to reach the results and apply them in new situations, such as Perkins and Plyth. Teaching Perceptions Model, David Perkins and Tina Blyth, 1994, at Braintree, Massachusetts, developed a framework that provides teachers with steps to plan and teach any subject in an integrated manner. The framework highlights four key elements that can be adopted to design modules or as a model. Teaching for understanding, and confirmed both Perkins and Blyth that this is the adoption of the model Auar learners the opportunity to do work and activities that require reflection on specific topics, and do several processes such as clarification, giving proofs and examples, Uncles and application simulation and expression of experiences in new ways. (Yassin and Zeinab, 2012: 163)

The researchers believe that it is necessary to know the impact of the use of teaching models, including the Perkins and Plaith model, which is based on the interaction between teacher and learner in the teaching of mathematics, and its suitability with the educational environment in Iraq and the characteristics of learners and educational content, and it can be said that the current research is gaining The importance of the importance of mathematics and the importance of the Perkins and Plyth model.

Research Objective:

This research aims to know: -

The effect of Perkins and Plyth model in mathematical communication among the fifth students of biological science in mathematics.

Research hypothesis:

To achieve the research objective, the following zero hypothesis was formulated:

There is no statistically significant difference at the level (0.05) between the average grades of students of the experimental groups, which are studied according to the Perkins and Plyth model, and the control group, which is taught according to the usual method of sports communication.

search limits

The current search is limited to the following parameters:

1. Students of the fifth grade of biological science, Directorate General of Education Baghdad / Karkh second in public schools day.
2. Chapters (fourth and fifth) of the book of mathematics scheduled for the fifth scientific grade (I 9, 2018 AD), Ministry of Education / Republic of Iraq.
3. Duration of the first semester of the academic year (2018 - 2019).

Define terms

1. Perkinsoplayth model

Known by:

(Perkins and Plath 1994) that:

"A model of teaching based on constructivist theory provides learners with the opportunity to carry out activities and activities that require thinking on certain topics and conducting various processes such as clarification, giving proofs, examples, generalization, application, simulation and expression of experiences in new ways." (Yassin and Zeinab, 2012: 162)

_ (Najdi et al. 2005) that:

"One of the models of teaching philosophy based on constructivist philosophy, which emphasizes the active role of the student where he conducts many activities and scientific experiments in the activity so that meaningful learning based on understanding occurs" (Najdi et al., 2005: 411)

The researchers adopt Perkins and Plythe definition of his followers specific steps to achieve the desired goal.

2. Sports communication

Known by:
(Badawi, 2003) that:
"The exchange of mathematical ideas, information or opinions between the teacher, his students and the students themselves through speaking, listening, reading, writing and acting." (Badawi, 272: 2003)

(Al-Faisal, 2012) that:
"A complex activity of several skills, which helps the individual to use the language, symbols and terms of mathematics, to be able to learn or teach, and includes listening, reading, writing, discussion and representation skills.

(Al Faisal, 2012: 14)

Theoretical framework:
Perkins and Plyth model

Considering the constructivist theory, it focuses on meaningful learning based on the active role of the student, the active intellectual participation of students in activities carried out by groups or teams to build their concepts and knowledge, and makes the learner the center of the learning process. (Muhammad, 2010: 59) According to the researchers, constructive teaching seeks to create an interactive and challenging learning environment for students' ideas. There has been a global interest in the application of constructive practices in science education and learning, and there are many and varied strategies and teaching models based on constructivist theory, because constructivist theory did not They offer specific teaching strategies and models, but they provide criteria for effective teaching. One of the most important models based on constructivist philosophy is the Perkins and Plyth model. This model is also called instruction for comprehension. Perkins defined comprehension (prikins, 1993) as the ability to implement a large number of He added that concepts are inherently complex and cannot be understood by a single experience and not everything is understood about a particular topic because there are so many applications and relationships that need to be discovered.This leads us to the fact that students need opportunities to re-understand concepts to build and expand them, Blythe (1998) added that a deep understanding is the ability to use knowledge beyond the content and context obtained. (Katami, 2012: 442) David Perkins of the Graduate School of Education at Harvard University and partner with Howard Gardener points out the idea of multiple intelligences with their famous Project Zero project, which began in the 1960s and has been applied in many countries to emphasize the concepts of learn-

ing and understanding in stages. Public education indicates that there is a difference between the concepts and information taught in schools about a subject, and the true understanding of specialization. Much research in the field of institutional development suggests that the phenomenon of change suffers from what can be called the gap between the idea and the implementation. This phenomenon is complex At the educational level, we need to narrow the gap, narrow the gap between the idea and the implementation, by adopting the philosophy of learning in order to understand its four main axes. Perkins and Gardner through their writings on learning for understanding, which is not based on one foot to stand education, as is happening today in our education, but based on four basic concepts, one of which floods our curriculum in its details, which is presented in our chapters in a sparse and detailed without providing bases Science itself and second are the methods adopted to achieve this understanding in the sense of, for example, what do I do as a teacher and a learner to achieve a high degree of understanding, and thirdly what is the goal in about a year of this study and what will return to the community, to society as a whole? Finally, what methods are adopted and why they differ and how this method can be developed. (Al-Bakr, 23: 2013) Both Perkins and Plyth emphasized that the adoption of this model provides learners with the opportunity to undertake actions and activities that require thinking on certain topics, and conducting several processes such as clarification, giving proofs and examples, uncles and practice, simulation and expression of the subject in new ways. (Al-Khalili, 1994: 255)

David Perkins explained the framework for learning for understanding more and found a relationship between him and the elements of teaching planning, as he linked what he called the four cornerstones of pedagogy of the framework of learning for understanding with the four elements of planning and teaching as explained: For the lesson.

Learning Framework: Elements of lesson planning

The four general questions about education: elements of learning for understanding that fit the questions

What should we know? Generated Themes

What is worth understanding? Objectives of understanding

How we should study for understanding: performances of understanding

How students and teachers can:

They know what students understand, and how students can

Develop a deeper understanding (https://learnwep.harvard.edu/ALPS/tfu/infocfm)

Perkins (1998) assumes that everything on a particular subject cannot be understood because there are so many applications and relationships that the learner needs to discover, so that knowledge must be re-understood once and again and again until knowledge is rebuilt and eventually expanded. A key indicator of understanding is the adoption of knowledge beyond the content and context in which learning has already been made to other situations and uses. (Perkins & Blythe; 1994, 5)

For the learner (Perkins, 1999) emphasized three main and distinct roles that must be played by the learner in the course of structural learning, and these roles are that the learner is active during the learning process, social does not live alone builds knowledge through a social medium helps him, and especially creative If the conditions are conducive to creativity, discovering relationships and building knowledge by itself.

Constructive learning depends primarily on understanding. Students who are able to understand benefit from the appropriate types of experiences that the teacher provides them, which enables them to evaluate their thinking and those of others, and this greatly helps them to build their own knowledge. (Perkins, 1998; 12)

Stages of the Perkins and Plyth model:

Phase I: Generated topics

Providing scientific material, which is relevant to the learner's daily life and local environment.

Phase II: Objectives of understanding (understanding of concepts)

Determine the goal of learners' understanding of the course material provided, and reach the distinctive characteristics.

Phase III: Achievements of understanding (measuring understanding of concepts)

Involve students in the completion of educational tasks to learn the understanding of the subject.

Fourth stage: continuous evaluation.

Provide opportunities for learners to give them feedback both from the teacher and their peers, to modify and deepen the scientific concepts agreed upon among the scientists and develop them. (Perkins & Blythe; 1994, 39-45)

Search procedures

First: Research Methodology

The researchers adopted the experimental approach in the research, which is based on careful observation of the educational phenomenon un-

der study. (Anwar and Adnan, 2007: 474)

Second: Research design

The researchers used the pretest / post test design for two groups which is one of the real experimental designs (Figure 1).

Figure 1

Experimental design of the research sample

Experimental group	equivalent	– Pre-test – Mathematical communication	Application of the Perkins'& Blayth's model	– Post-test – Mathematical communication
Control group			application of the usual way	

Third: The research community

The current research community identified the students of biological science class in the Directorate of Education Baghdad / Karkh second morning study for boys for the academic year 2018 - 2019 m and in public schools only have chosen researchers intentionally (preparatory Mahmoudiya scientific boys) of the Directorate General of Education Baghdad second Karkh because of the presence of many reasons Of which :

1. The cooperation of the school administration with researchers and this is necessary for the success of the experiment.
2. The school contains three sections for the fifth grade of biological science, where the total number of students (102) students, which makes it easier for researchers to choose a good sample and equivalence.
3. Social and cultural affinity for students of the two research groups.

Fourth: The research sample

The researchers worked on an agreement with the school administration on facilitating the task of conducting the experiment. Two divisions were selected by random drawing. After confirming the two divisions, Division A was randomly selected to represent the experimental group studied according to the Perkins and Plyth model and Division C to represent the control group. According to the traditional method, the number of respondents was (70) students, and after the exclusion of the statistically repetitive students (2) students and many statistically absent (2) students, the number of respondents in the two divisions was (66) students, table

(3). The minimum acceptable sample size is (15) individuals Per group. (Anwar and Adnan, 2008: 309)

Table (3)

Number of students of the experimental and control groups before and after exclusion

Groups	Division	Number of students before exclusion	Number of excluded students	Number of students after exclusion
Experimental group	A	33	1	32
Control group	C	37	3	34
Total	2	70	4	66

- Equivalence of the two research groups:

Before applying the experiment, the researchers conducted a parity between students of the two research groups in some variables that may affect the results of the research at the level of statistical significance (05.0) and the degree of freedom (64) as shown in Table (4).

Table (4)

Equivalence

variable	group	No.	mean	standard deviation	T value		Statistical significance
					Calculated	Tabular	
Chronological age	Experimental	32	190.9162	20.1840	0.2170	2	not statistically significant
	Control	34	190.6764	16.2708			
Previous degree in mathematics	Experimental	32	68.5312	161.374	0.04993		not statistically significant
	Control	34	66.9705	160.734			
Intelligenc	Experimental	32	20.8125	46.1339	1.4944		not statistically significant
	Control	34	17.8824	79.5730			
Mathematical Communication	Experimental	32	0.95	0.6131	1.740		not statistically significant
	Control	34	1.36	0.7214			

Adjust extraneous variables

The researchers identified the variables related to experimental procedures that may affect the dependent variable and experiment as follows:

1. Classes: The weekly schedule is organized so that the mathematics of the two research groups is taught in the same days by four classes per group per week.
2. Duration: The experiment lasted about (6) weeks from 14/11/2018 to 30/12/2018.
3. Subjects: The research groups studied the chapters (fourth and fifth) of the textbook of mathematics scheduled for the fifth grade of biological science.
4. Teacher: One researcher taught the two research groups himself to ensure the safety of the experiment from the impact of students on the differences resulting from the methods of teachers, and personal characteristics.
5. Summer environment: means testing the classroom as the two research groups (experimental and control) were taught in one classroom, because the school operates the system of classrooms for teachers.
6. Experimental extinction: Two interruptions occurred within the duration of the experiment in the research sample of both groups and were statistically excluded.

Search Requirements

1. Determine the educational material for the research experience

The teaching material that was studied during the experiment was determined from the book of mathematics for the fifth grade of biological science and were as follows:

a. Chapter Four (Circular Functions). B. Chapter V (Goal and Continuity).

2. Number of teaching plans: -

The researchers prepared teaching plans for the research groups (experimental and control) and presented a model for each of a group of experts and specialists in teaching mathematics to indicate their views and observations, and in the light of the amendments were made.

Search Tool:

The experiment requires a test of mathematical communication and given the existence of a mathematical communication test prepared by (Zeina, 2013) for the fifth grade students, so the researchers will adopt this test after adapting the research sample by finding psychometric properties.

• Virtual honesty of the test:

The mathematical communication test was presented to a number of arbitrators from mathematics disciplines and teaching methods who supported that the test paragraphs are suitable for the sample and the purpose for which they were developed, thus the test is apparently honest.

• Test stability:

After applying the test to a prospective sample, the researchers extracted the stability using the Koder-Richardon 20 equation because it is suitable for the paragraphs whose answer is (0.1).

Statistical means

1. T-test of two unequal independent samples.

a. To check the equivalence of the two groups.

B. To compare the average scores of students of the two research groups to test the zero hypothesis of the research.

(Assaf: 1989, 141)

2- Equation of the magnitude of impact

To make sure that the size of the differences using (T) test are real differences, the value of (□2) is calculated and by (□2) the value of d) can be calculated which indicates the magnitude of the effect. ((Kiess, 1989: 445

research results

To verify the research hypothesis that there is no statistically significant difference at the level of (05.0) between the average scores of students studied using the Perkins and Blith model and the average scores of students who studied using the standard method in the mathematical communication test.

The researchers used the T test of two independent samples and Table 5 illustrates this.

Table (5)

Arithmetic mean, variance and T value (calculated and tabulated) of the scores of the two groups in the mathematical communication test

group	No.	mean	variance	Degree of freedom	T value		Statistical significance at the level of 0.05
					Calculated	tabular	
Experimental	32	3.02	3.78	64	3.45004	2	significant
Control	34	1.34	4.03				

It is clear from Table (5) that the difference is statistically significant at the level of (0.05), and the degree of freedom (64), where the calculated T value (45004.3) is greater than the tabular T value of (2), and thus reject the zero hypothesis, and accept the alternative hypothesis .

To determine the effect of Perkins and Plyth's model on mathematical communication, the researchers calculated the magnitude of the effect of the independent variable in the dependent variable, because the level of statistical significance alone does not indicate the strength of the correlation between the two variables because it ranges between (01.0 - 05.0) and determined by the researchers in advance More precisely, therefore, the magnitude of the effect guides us towards the interpretation of the impact, and confidence in the results and therefore calculated the value of the square Eta (□2), and then calculate the value of (d) which refers to the magnitude of the impact, where the value of (d) (4.0) This indicates that the influence of the Perkins and Plyth model on the mathematical communication of the research sample is small, (Kiess, 1989). If the value of NH (d) between (2.0 to 4.0) have the size of a small effect, and between (5,0- 7,0) is the average size of the effect, and (8,0) above the size of the impact is significant.

Interpret the results

The results resulted in the rejection of the zero hypothesis, which means that the experimental group students who studied according to the Perkins and Plyth model surpassed the control group students who studied in the normal way in the mathematical communication test. This result was logical, as Perkins and Plythe model with its principles and procedures is a method. Effective for the development of thinking in general, and in the field of generating new ideas in particular, and with the presence of statistically significant differences on the excellence of the experimental group in the test of mathematical communication, we see that the level of mathematical communication in the experimental group in general did not exceed (59%) The percentage of the control group was (29%), ie there is a general weakness in sports communication and this concludes my machines: -

• Weakness of students in mathematical communication and generate new ideas and solve problems.
• Perkins and Plyth model develops mathematical communication.

Recommendations

• Adoption of the Perkins and Plyth model in the teaching of mathematics,

especially topics that can be formulated by the teacher in the form of problems that can be discovered by the student to solve.

• Discuss the subject of modern teaching methods, including the Perkins and Plyth model in the training courses held by the Directorates of Education.

• Include teachers' books and guides for mathematics for the Perkins and Plyth model and mathematical communication.

Proposals

To complement this research, the researchers propose the following research:

1- The effect of using Perkins and Plyth model in the treatment of some learning difficulties in mathematics among primary and secondary school students and the trend towards mathematics.

2 - The effect of using the Perkins and Plyth model in the teaching of mathematics in the development of achievement and some critical thinking skills of secondary school students.

3 - Preparation of a proposed program to train teachers and teachers of mathematics on the use of some teaching methods based on the constructivist theory, especially the Perkins and Plyth model.

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