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Impact of Using Karplus Model to Develop Inferential Reasoning Skills and Legal Knowledge in Handball Among Students

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ABSTRACT
The research aims to identify on effect Model Carplus in development skills thinking inferential and knowledge For the articles of the law in ball hand I have The students, and the researcher assumed there were Differences The indication Statistics in The two tests Tribal Post-test for the experimental group In the variables in thinking inferential and knowledge Legal in ball hand I have The students. The researcher also used the experimental method as it was suitable for the nature of the research, and the researcher conducted his research on Students of the Faculty of Physical Education and Sports Sciences At university Samarra for the academic year 2024/2025, (68) students were chosen randomly. The participants were divided into three groups, and group (A) was chosen by lot to represent the experimental group. The researcher used statistical methods including the arithmetic mean, standard deviation, independent samples t-test, paired samples t-test, and percentage. The researcher concluded that the Karplus model had a positive effect. in development skills thinking inferential and knowledge Legal in ball hand I have the students, and the researcher also recommended emphasizing the importance of using the Karplus model in developing inferential thinking skills in handball and moving away from traditional methods that bring boredom and weak motivation towards learning and using this model in other games.

Keywords: Karplus Model; Inferential Reasoning; Knowledge Legal; Handball; Students.

ABSTRAK
Penelitian ini bertujuan untuk mengidentifikasi efek Model Carplus dalam pengembangan keterampilan berpikir inferensial dan pengetahuan Untuk pasal-pasal hukum di tangan bola saya memiliki Siswa, dan peneliti berasumsi ada Perbedaan Indikasi Statistik dalam dua tes Suku Pasca-tes untuk kelompok eksperimen Dalam variabel dalam berpikir inferensial dan pengetahuan Hukum di tangan bola saya memiliki Siswa. Peneliti juga menggunakan metode eksperimental karena sesuai dengan sifat penelitian, dan peneliti melakukan penelitiannya terhadap Mahasiswa Fakultas Pendidikan Jasmani dan Ilmu

Keolahragaan Di universitas Samarra Untuk tahun akademik 2024/2025, (68) mahasiswa dipilih secara acak. Para peserta dibagi menjadi tiga kelompok, dan kelompok (A) dipilih dengan undian untuk mewakili kelompok percobaan. Peneliti menggunakan metode statistik antara lain rata-rata aritmatika, standar deviasi, uji t sampel independen, uji-t sampel berpasangan, dan persentase. Peneliti menyimpulkan bahwa model Karplus memiliki efek positif. dalam pengembangan keterampilan berpikir inferensial dan pengetahuan hukum dibola tangan saya memiliki Siswa, dan peneliti juga merekomendasikan untuk menekankan pentingnya menggunakan model Karplus dalam mengembangkan keterampilan berpikir inferensial dalam bola tangan dan menjauh dari metode tradisional yang membawa kebosanan dan motivasi yang lemah untuk belajar, dan menggunakan model ini dalam permainan lain.

Kata Kunci: Karplus Model; Inferential Reasoning; Knowledge Legal; Handball; Students.

INTRODUCTION

In light of the rapid advancements in education, it has become essential to adopt modern teaching models that enhance students' advanced thinking, analytical, and deep comprehension skills, rather than relying on traditional methods based on memorization and rote learning. This necessitates a crucial element: developing the student's role positively and enhancing their ability to engage, collaborate, research, and become self-reliant. Furthermore, teachers must utilize appropriate teaching methods to improve the educational landscape, particularly in the field of physical education.

Therefore, Teaching models based on constructivist teaching can be tested to achieve effective teaching because they enable individuals to monitor and regulate their performance. This, in turn, is reflected in student learning, allowing them to grasp the material more quickly, with less time, effort, and cost (Thaer Ghayari, 2010, p. 11). One such model is the Karplus model, a constructivist model introduced by the educator Karplus in 1973. He believed that learning progresses and is renewed through this model, which is a good application of Piaget's educational ideas that align with how students learn and provide a suitable environment for achieving effective teaching (Zaitoun, 2007, p. 446).

Learning cycle is a fertile environment for stimulating learning. thinking the deductive reasoning is not considered to be this type of thinking. Column vertebrae for operations mentality, He The process that He managed individual from Overcome Information Available To access to Conclusions Logical not Known In advance. And it lies Its importance in Being The tool that Data transformation "Raw " to " Knowledge" " Useful " Which Helps in solution Problems complex from during Link Methodological between Reasons And the results. As well. Grants mind ability on trial Logic, Famez individual between arguments strong and the claims The flimsy one, which builds wall bodice against Misinformation and haste in Issue The rulings. Thus, it represents Reasoning essence intelligence humanitarian that Guarantees safety Planning Accuracy Implementation in various Fields life Scientific and the process.

arises to teach legal knowledge using methods that integrate kinesthetic thinking with cognitive processes, given the complex nature of these skills, which require intelligent and rapid responses in a changing environment. Mastering the laws of handball, for example, demands a high level of mental and motor flexibility, which can be

achieved using interactive teaching models such as the Carplus model. On the other hand, familiarity Materials the law International early hand from Things The mission And the main one that It should on student college physical education Understanding it well where that it Help on completion Performance and management Matches In a way Good. And it should. that He is the student on level good from and knowledge Materials the law until It is possible for him education His students In a way good after those graduates And he becomes a teacher for education Sports. Where that it no maybe neglect side Legal where connects Performance The skillful And the artist, And it lies Importance of research in more possibility students in Aspects cognitive and performance arbitration more level thinking inferential Which Reflected Positively on Aspects cognitive The other For the law International early hand, from during Use The method teaching The most effectiveness with the environment Educational Please on development Their abilities in employment Knowledge For the side Applied and reflection that on the job Al-Midani, To obtain on outputs Educational The level The principle of "moving from learning to learning" is highly valued .

The research problem lies in the existence of gap clear between " knowledge Theory of Materials law ball hand and between the application The field " with" student's colleges Education Physical; where no Still Methods traditional Followed in teaching focus on Indoctrination, which led to weakness in Abilities cognitive Related quickly Response For positions variable during Playing.

It is noted the researcher (by virtue of His experience (field) that students They face difficulty in Link between Text Legal The Decision Fast in Cases Play complex, Which summons Search on Models Educational Modern Enhance Thinking And the conclusion. From here crystallizes the problem in Question The following what effect Use Model Carplus in Developing inferential thinking skills and knowledge Legal And the ability on Taking decision in ball hand I have Students?

Research objectives it aims Search to identification on effect Model Carplus In deductive reasoning and knowledge acquisition of legal materials and refereeing performance in football hand for the students. Identifying the differences between the experimental and control groups in reasoning, knowledge acquisition in law subjects, and refereeing performance in handball among students.

Research hypotheses: It is assumed researcher what It comes There are statistically significant differences between the pre-test and post-test for the experimental and control groups in inferential reasoning, knowledge acquisition of handball law subjects, and refereeing performance of the students, in favor of the post-test. There are statistically significant differences between the experimental and control research groups in inferential reasoning, knowledge acquisition of handball law materials, and refereeing performance of the students, in favor of the experimental group.

Karplus (by definition): One of the teaching models that relies on translating some ideas of Jean Piaget's constructivist cognitive theory, which emphasizes the positive interaction between the teacher and the learner to achieve the alignment of new knowledge with prior knowledge within the learner's cognitive structure according to three stages: the exploration stage, the conceptual creativity stage, and the concept application stage. (Al-Khazraji, 2011, p. 143) The researcher defined it operationally as: a teaching model used by the researcher to develop social behavior and teach some basic

football skills to the students of the current research sample. It is the interaction between the teacher and the members of the experimental research sample and the interaction between them as individuals, and it proceeds according to three stages: (the stage of revealing the concept - the stage of presenting the concept - the stage of applying the concept).

Deductive reasoning" is an advanced form of abstract thinking, used by the individual when faced with a problem, attempting to reach a solution mentally through known premises to achieve unknown results by moving from particulars to generalities (induction) or from generalities to particulars (deduction) (Waad 2013, 25). The researcher defined it operationally as follows: It is the score a handball player receives when answering the items on the scale.

METHOD

The experimental approach was selected by the researcher because it best suited the nature and topic of the study. During the 2024–2025 academic year, third-year students from Samarra University's College of Physical Education and Sports Sciences participated in the research. Three groups (A, B, and C) comprised the total of 68 pupils. 36 students were randomly selected to participate in the research based on the curriculum of Samarra University's College of Physical Education and Sports Sciences. This represents 52% of the whole population. Using a simple random technique, the sample was divided into two groups by drawing lots. Twelve students from section (A) comprised the trial group, which was subjected to the Karplus model. Twelve students from section B made up the control group, and they were subjected to the same procedure as the college. This indicated that the group consisted of 24 individuals. Finally, the last 18 kids were included, and the experimental tests were done with them as well.

Homogeneity of the research sample

In order to control for variables that might affect the accuracy of the research results and to attribute the differences in effect only to the independent variable, the researcher resorted to To verify the homogeneity of the research sample in variables related to anthropometric measurements, namely (height, Mass and chronological age) and by finding Levene's coefficient as shown in Table (1).

Table 1. Homogeneity of the Research Sample Is Shown in Terms of Anthropometric Variables (Height, Mass, Chronological Age).

Variables	Group	M.	St.d	Freedom Degrees between groups	Freedom Degrees within groups	Levene's value	Value T Calculated	Sig. level	Sig. Type
Height	Ex.	176.3750	7.68440	1	30	0.596	-087-	931	Insig.
	Co.	175.6875	7.98097						

Mass	Ex.	72.5000	8.00000	1	30	0.173	401	691	Insig.
	Co.	71.1875	7.41367						
Age	Ex.	22.4375	1.63172	1	30	0.281	486	630	Insig.
	Co.	21.6875	1.81544						

Thinking Inferential

The researcher reviewed the theoretical literature and previous studies related to the current research topic, which addressed the subject of inferential thinking. The researcher adopted the inferential reasoning scale. Prepared by (Mehdi, 2024) Being the study closest to the current study in terms of the target sample and study conditions, where the scale From (36) paragraphs with three alternatives, namely (A, B, C).

Knowledge achievement test for international handball law subjects

Knowledge acquisition is a crucial variable in the process of developing students and preparing them to master the rules of handball, as it forms the basis upon which the referee interprets play situations and makes decisions. Since the research sample consists of students from faculties of physical education and sports science, and their familiarity with international rules is important, this study focuses on their understanding of the rules. Handball is taught in the third year as a curriculum, so this variable is suitable for the research steps and sample. After the researcher reviewed previous studies and research and in line with the research objectives, the researcher adopted and implemented the scale prepared by (Alaa, 2020). For the same sample and author of (52) items, the answer to the items of the scale was closed (multiple choice), and the scale was adopted as is without any modification or deletion by the experts as shown in Appendix (2).

Setting out instructions for the legal knowledge achievement test

After the standardized test prepared by (Alaa, 2020) was adopted, specific instructions were developed due to their importance in the respondents' answers to the knowledge scale. Sabah Al-Ajili (2002) emphasizes, "The clarity of the standardized test instructions is of paramount importance in the successful administration of the test. Studies have demonstrated the significant role these instructions play in altering or influencing test results, making it difficult to compare the results of the same test in different situations." It is noteworthy that there are two types of instructions: the first pertains to test scoring, score interpretation, time limits, and other related matters; the second concerns the test-taker's ability to answer the questions. Mustafa Muhammad (1990) confirms that certain rules are followed in developing these instructions:

1- Its language should be simple and clear in meaning, so that what is required is understood within a short time without going into detail and giving an opportunity to pay attention to those examples before starting the test.

2- It is preferable that it contains illustrative examples to answer questions or paragraphs that the test-taker is not familiar with before and gives him an opportunity to pay attention to those examples before starting the test.

3- It is preferable to clarify the purpose of the test, the time allotted for answering, and how to record the answer to each question or section. Maintaining the confidentiality of the details of the answers is crucial, and careful and accurate responses are essential. The researcher based the instructions for the handball legal knowledge achievement test on these principles.

Exploratory study

This first exploratory experiment for inferential reasoning evaluates the cognitive achievement of the handball law. In order to ascertain the following, the researcher assessed the cognitive accomplishment and reasoning skills of 10 third-year students from Samarra University's College of Physical Education and Sports Sciences on Wednesday, October 8, 2025, at 9:00 AM: the reliability of the search's user test. The equipment, tools, and playgrounds required to do the basic experiment were prepared. how long it takes to finish the test questions. to show how well the language in the program corresponds with the research sample's level of competency. learning more about the achievement test. guaranteeing the quantity and efficiency of the support staff in carrying out their responsibilities. The extent to which the paragraphs in the instructional sections of the educational unit are suitable and authentic, as well as the extent to which students respond to these paragraphs.

Second exploratory experiment of the model Carplus: The researcher, with the assistance of the support team, conducted the second pilot study on Wednesday, January 9, 2025, on a sample of (10) students to verify how to apply the steps of the CARPLUS model used in the research. They were chosen randomly from those excluded from the main experiment. The results of this pilot study were: Informing the subject teacher about how to implement the educational units. Ensuring that the educational units, their duration, and their sections are suitable for the research sample. Identifying errors, difficulties, and problems that have arisen during implementation and preparing for them. Knowing the obstacles that the teacher encounters in educational units and avoiding mistakes. The extent of the validity and suitability of the paragraphs in the lesson sections of the educational unit and the extent of students' response to these paragraphs.

Handball Referee Performance Evaluation Form

Based on the researcher’s review of previous studies in the field of handball, the refereeing performance form prepared by the researcher (Samer Mahdi 2017) was adopted, as shown in Appendix (3).

Pre - tests

Conducted a knowledge achievement test in international law, handball, and deductive reasoning on Tuesday, October 14, 2025, for students of the level Third in the College of Physical Education and Sports Sciences at Samarra University And on the theory halls at 9 am.

Equivalence of two research groups

In order for the researcher to be able to attribute the differences in the post-test results of the variables under study (inferential thinking), (students’ cognitive achievement), and (judging performance) to the effect of the experimental factor, the researcher resorted to verifying the equivalence of the two groups (control and experimental) by using the (T) test for independent samples, as shown in Table (2).

Table 2. Process of Determining Equivalence Between the Two Groups (Control and Experimental) Reveals the Variables Under Investigation.

Variables	Group	M.	St.d	Value T Calculated	Sig. level	Sig. Type
Reasoning Scale	Ex.	18.1875	2.16699	-087-	931	Insig.
	Co.	18.2500	1.87972			
Cognitive Achievement Test	Ex.	8.1875	1.86971	401	691	Insig.
	Co.	7.9375	1.65202			
Arbitration Performance Form	Ex.	2.0625	0.77190	486	630	Insig.
	Co.	1.9375	0.68007			

Preparing educational units using Carplus model

The educational program "is a plan that must be followed, and the physical education program is a set of planned experiences that participants practice through sports activities" (Al-Hilah & Mar'i, 2013, p. 199). To achieve the research objectives, the researcher, through his review of many scientific sources and references and personal interviews, presented the Karplus model educational unit via a questionnaire to a group of experts and specialists in the field of teaching handball activities and methods of teaching physical education and motor learning, with the aim of benefiting from their opinions and guidance on the extent of the suitability of employing this model within the prepared educational units. Through this procedure, the researcher prepared an educational program using the Karplus model in the form of educational units and its three steps, according to the time of lessons approved by the college. Therefore, the researcher provided all the requirements and tools for the activity according to this model. The researcher relied on the vocabulary of the handball law curriculum in preparing the educational units in a manner that is appropriate to the educational stage and the abilities of the students. The educational units for deductive thinking were prepared for the experimental group using the Karplus model, while the control group was subjected to the curriculum and the method of the professor of the subject followed, under the same conditions, conditions, time and distribution of the time of the educational unit. The researcher designed the units considering the factors, the most prominent of which are.

The instructional modules should accomplish their objectives and be suitable for the sample's abilities. The framework of the program should facilitate the accomplishment of the objectives. establishing the unit's time constraints. When putting the instructional units into practice, the researcher took the following actions: On Thursday, October 16, 2025, the students in the experimental group received an introduction unit so they could identify the following before beginning to apply the instructional units created in accordance with the CARPLUS model: Knowing the Karplus model and how to use it. Determining the goals and methods of the educational program created using the CARPLUS model.

Main Experiment

Together, the subject master and the researcher implemented the instructional modules. It was created for the first semester of the 2024–2025 school year, with ten learning units and a total of 900 minutes of time, using the Karplus paradigm. There were

two 90-minute study units every week from Sunday, October 19, 2025, to Wednesday, November 19, 2022. The program's instructional time is divided into three sections:

Section for Preparation: For both the experimental and control groups, this 24-minute segment is identical. An introduction, a general and particular warm-up, and some general remarks are all included. There are a six-minute opening, an eight-minute general warm-up, and a ten-minute specialized warm-up and physical exercises. Preparing the body for the abilities taught in the previous modules is the aim of this section. The main part lasts for 56 minutes and is where the Karplus model is taught to the experimental group to improve their mathematical thinking and understanding of handball rules. Conversely, the subject teacher's lesson ideas are taught to the control group. Learning exercise: 16 minutes, including a 6-minute concept-unveiling phase Here, the instructor explains and demonstrates the legal information to the class via flex photos, or posters. The children are then divided into groups of three to four by the instructor. By posing a question on the law or a gaming scenario, the instructor makes advantage of what the pupils already know about something new. This lets the students guess and imagine what will happen in the game and how the arbitrator will decide the case. Then, the students talk about what they think and what they expect will happen when they use the new skill.

In the concept discovery phase, expectations are linked to predictions, and students are allowed to think and consult within the group to grasp the correct concept using the senses. Concept presentation phase: (10) minutes of explanation and presentation of the law by the physical education teacher, using visual aids to facilitate the explanation and presentation in the performance. for- Practical activity: 40 minutes and includes. Concept application phase : This is where the concept is obtained Based on the information and interpretation of the question posed by the teacher, and explaining the results based on previous experiences, and conveying the correct understanding to the students that is consistent with the theoretical information of the skill through one of the students who is randomly chosen to represent the group after consultation among them.

The rule and its application are then implemented after receiving feedback and repeating the exercise, correcting errors collaboratively with the group members. The teacher may intervene in cases where students struggle to find solutions. Upon completion, the teacher evaluates the students. Final section: (10) minutes the teacher gives feedback on the lesson summary and provides the correct answers to the question posed in the first step, after which the students leave and return the tools. Each group was studied according to the method specified for it in advance, as follows: Experimental group (used Carplus model). Control group (teacher's method) The material followed). took into consideration what It comes: The experimental and control groups learned international law and arbitration performance. Correction and individual and group feedback are given to the experimental group during the performance. Compensation for any learning unit that falls on an official holiday or Any emergency. total time for the educational units of the model amounted to Carplus 900 minutes.

Post-tests

After completing the educational curriculum, the researcher conducted the post-tests for knowledge acquisition in international law and inferential reasoning under investigation on Thursday, November 20 , 2025. The researcher ensured that the

conditions were similar to the pre-tests in terms of time, place , and the presence of the same assisting team. The same steps were used in the pre-tests in the way the tests were measured for the students.

Statistical methods

The researcher used the SPSS statistical software package to extract the following laws: mean, standard deviation, independent samples t-test, t-test for related samples, Percentage.

RESEARCH RESULTS

Presentation and analysis of pre- and post-test results of experimental group

Table 3. The Experimental Group's Pre- and Post-Tests of the Study Variables Are Shown in the Report, Along With The T-Value, Amount of Statistical Significance, Mean Difference, Standard Deviation Of Differences, and The Type Of Statistical Significance.

Variables	Test	M.	St.d	F	FD	Value T Calculated	Sig. level	Sig. Type
Reasoning Scale	Pre	18.1875	2.16699	-12.00000-	2.68328	-17.889-	0.000	Sig.
	Post	30.1875	1.64190					
Cognitive Achievement Test	Pre	8.1875	1.86971	-34.87500-	3.99792	-34.893-	0.000	Sig.
	Post	43.0625	3.37577					
Refereeing performance	Pre	2.0625	0.77190	-5.81250-	1.27639	-18.215-	0.000	Sig.
	Post	7.8750	0.80623					

Tables (3) shows the results of the pre- and post-tests in the experimental group of tests. Prior to the exam, the mean score on the inferential reasoning test was 18.1875, with a standard deviation of 2.16699. Following the exam, the average math score was 30.1875, with a standard deviation of 1.64190. The average difference between the pre-test and post-test scores was -12.00000, with a 2.68328 standard deviation. Both (t) (-17.889) and (sig) (0.000), which are less than 0.05, demonstrate that the pre-test and post-test differed significantly, with the post-test winning. The math post-test mean score was 43.0625, with a standard deviation of 3.37577. The cognitive accomplishment mean score for the pre-test was 8.1875, with a standard deviation of 1.86971. The mean difference between the pre-test and post-test was -34.87500, which required 3.99792 standard deviations. There was a significant difference between the pre-test and post-test, with the post-test winning, according to the (t) value of -34.893 and the (sig) value of 0.000, which is less than 0.05. Prior to the test, the arbitration performance had a mean of 2.0625 and a standard deviation of 0.77190. Following the test, the arbitration performance had a mean of 7.8750 and a standard deviation of 0.80623. The mean difference between the pre-test and post-test was -5.81250, with a standard deviation of 1.27639. We discovered that the post-test outperformed the pre-test by a significant

margin. The (t) value of -18.215 and the (sig) value of 0.000, both of which are less than 0.05, demonstrate this.

Presentation and analysis of the pre- and post-test results for the control group:

Table 4. T-value, Means, Standard Deviation, Mean of Differences, And Standard Deviation of Differences. Determined The Statistical Significance Level and Type For the Control Group's Pre- and Post-Tests Of the Study Variables.

Variables	Test	M.	St.d	F	FD	Value T Calculated	ig. level	ig. Type
Reasoning Scale	Pre	18.2500	1.87972	-9.37500	2.09364	-17.911-	15	Sig.
	Post	27.6250	2.02896	-				
Cognitive Achievement Test	Pre	7.9375	1.65202	-22.0625	2.59406	-34.020-	15	Sig.
	Post	30.0000	1.82574	0-				
Refereeing performance	Pre	1.9375	0.68007	-4.12500	80623	-20.466	15	Sig.
	Post	6.0625	0.68007	-		-		

Table (4) shows the results of the pre- and post-tests for the control group as follows: The pre-test score for inferential reasoning was 18.2500, with a standard deviation of 1.87972. The post-test mean score for arithmetic reasoning was 27.6250, with a standard deviation of 2.02896. The pre-test and post-test had a mean difference of (-9.37500), with a standard deviation of 2.09364. The sig value was 15 and the t value was -17.911. This is less than 0.05, indicating that the pre-test and post-test differed significantly, with the post-test showing a greater difference.

The mean score on the cognitive success pre-test was 7.9375, with a standard deviation of 1.65202. The math mean score on the post-test was 30.0000, with a standard deviation of 1.82574. The average difference between the pre-test and post-test was -22.06250, with a range of 2.59406. The t-value was -34.020, and the significance level was 15. This is less than 0.05, indicating a substantial difference favoring the post-test over the pre-test.

Mean of pre-test results for arbitration performance was (1.9375) with a standard deviation of (0.68007), and the arithmetic mean in the post-test was (6.0625) with a standard deviation of (0.68007). The average value of the differences between the pre-test and the post-test was (-4.12500) with a standard deviation of (0.80623). The calculated value of (t) was (-20.466), and the value of (sig) was (15), which is a value less than (0.05), indicating a significant difference between the pre-test and the post-test in favor of the post-test.

Presenting and analyzing the post-test results for the experimental and control groups:

Table 5. Results show means, standard deviation, calculated t- value , significance level, and statistical significance of posttests between experimental and control groups for research variables.

Variables	Group	Mean	St.d	Value T Calculated	Sig. level	Sig. Type
Reasoning Scale	Ex.	30.1875	1.64190	3.927	0.000	Sig.
	Co.	27.6250	2.02			
Cognitive Achievement Test	Ex.	43.0625	3.37	13.614	0.000	Sig.
	Co.	30.0000	1.82			
Arbitration Performance Form	Ex.	7.8750	0.80	6.874	0.000	Sig.
	Co.	6.0625	0.6 8007			

Table (5) displays the differences and changes in the math means and standard deviations between the students in the control group, who studied using the teacher's technique, and the students in the experimental group, who utilized the Karplus model, on the post-tests. We observe the following:

The experimental group had a mean score of 30.1875 for inferential reasoning, with a standard deviation of 1.64190. The average score for the control group was 27.6250, and the range of scores was 2.02896. The (t) test was used to split and compare groups and figure out what the change in the math means meant. It turned out to be less than the expected (t) value of 3.927 at a significance level of 0.05. The post-tests for the experimental group were very different from those for the control group, which is great news.

The experimental group's mean score was 43.0625, whereas the control group's standard deviation was 3.37577. The control group had a mean score of 30.0000 and a standard deviation of 1.82574. The significance of the discrepancies between the mathematical means was determined using the (t) test. At a significance level of 0.05, the computed (t) value for independent and identical samples was (13.614), which is more than its tabular value. The good news for the experimental group is that their post-tests differed significantly from those of the control group.

The experimental group's judgment success had a mean score of 7.8750 and a standard deviation of 0.80623. The mean score for the control group was 6.0625, with a standard deviation of 0.68007. To determine the significance of the variations in the mathematical means, we used the (t) test. The computed (t) value of 6.874 for independent and equal groups is greater than its tabular value at a significance level of 0.05, according to the findings. This indicates that the post-tests of the experimental group and the control group vary significantly in favor of the experimental group.

DISCUSSION

Discussion of results of pre- and post-tests of variables under study for experimental and control groups:

Tables 3 and 4 show the experimental and control study groups' pre- and post-test results for inferential reasoning, cognitive accomplishment, and refereeing performance. It was evident that the two groups differed, with the experimental group doing better. According to the researcher, the students' capacity to fulfill all the learning

requirements throughout the suggested curriculum units was the reason for the experimental group's varying results on the pre- and post-tests. Many believe that this program is among the greatest strategies to assist pupils in realizing their potential and achieving their objectives. The researcher employed a lot of learning and teaching language, had the instructor and student engage throughout the class, exhibited educational information live by both the teacher and the student, and used technology to convey it in a symbolic fashion, all while using the Karplus model as a guide. The model includes both academic and practical information, as well as learning that is put into practice and evaluated in the real world. This discrepancy may also be attributed to the researcher's usage of presentations, explanations, and questions and answers for every section of the legal documents concerning international handball law, as well as the combination of other elements. Students' knowledge of the law has increased because of both the academic and practical components of their education. This is shown by their capacity to According to Abdul Rahim (1981), "The amount of change in knowledge depends on the situation in which the person gets the information, its source, its method, and the amount of mastery of it" (Abdul Rahim, 1981, p. 112).

The researcher observes the development of the control group's post-test results compared to their pre-test results in the research variables (inferential reasoning, (Cognitive achievement and judging performance), until the control group practiced the educational volume of educational content specific to the subject teacher and his teaching method to achieve The educational objectives also specific to the third stage With handball, the continuity of learning leads to the development of legal knowledge in general by bringing about changes in the behavior of learners day after day, with the presence of the educational material and the teacher and the accumulation of experience for the learner, and it may be at levels according to the nature of the teacher and his method and the response of the learner from the researcher's point of view, as (Dhafer , 2002,) confirms that the natural phenomena of the learning process must lead to development in learning as long as the teacher follows the steps of the sound foundations of learning and teaching (Dhafer , 2002, 102). There were big differences between the experimental group and the control group in how well the independent variable worked and how it affected inferential thinking. This meant that the control group did not grow as much as the experimental group did. how well students learn and how well they can judge handball games.

Discussion of the post-tests for the variables under study for the experimental and control groups

By looking at the post-test scores for the research variables (inferential reasoning, cognitive achievement, and refereeing performance) for both research groups (experimental and control), as shown in Table 5, it was clear that there were big differences between them, with the experimental group coming out on top. The researchers say that the students in the experimental group did better than the students in the control group because of how well the study's educational curriculum worked. It helped them improve their refereeing skills and stop making the same mistakes over and over again. It also helped them learn the rules of handball better because they were better at the subject. The Karplus model effectively improves students' ability to think critically and learn about the law in handball compared to the control group, as shown by the results of the pre- and post-tests for both groups. This is because it uses a high-

quality, cutting-edge teaching method that incorporates technology-based tools and devices that present information to students in a way that suits their interests and preferences, as well as a way that is fun and interesting for them. This is because the model combines the content of the lessons in a way that is sequentially, intensively, and in a way that is interconnected, by combining the content in one framework (applied educational video, posters) along with the teacher's explanation and practical exercises for the presentation.

Karplus model excelled, as this model represents an educational method that contributed to the clear impact on students and stimulated the brain to achieve the (discovery - presentation - application) stage. This situation led students to appreciate themselves and feel an internal sense of an effective educational environment between the students themselves and the teacher. In the field of learning, the mind represents a biological tool that leads to adaptation and a higher level of motivation to accomplish the motor task , as confirmed by (Gabori and Gholoum, 2020). Mental motivation is "a tendency with innate roots related to the instinct of curiosity and discovery, which appears clearly in the individual's behavior and theoretical actions"(Gabori and Gholoum, 2020, p. 20).

The researcher believes that by using the Karplus model to increase learning motivation, the experimental group's cognitive performance in the legal elements of handball improved. This is very different from the usual ways of learning, as shown by their increased acceptance of the scientific material and desire to learn it through video presentation. They are eager to consider and be enthusiastic about the indicators. According to the researcher, the Karplus model has a significant role in improving the Law of the Game materials' cognitive level and their practical applications (refereeing performance). It does this by focusing on more than one learning style, which in turn affects how well the student understands, comprehends, and perceives the theoretical and practical aspects of the educational content by way of presentation, explanation, and use.

The study found that the experimental group improved in handball refereeing, cognitive accomplishment, and inferential reasoning. This was due to the model's ability to enhance the students' cognitive abilities by gradually increasing the difficulty of the lectures and providing them with a range of tasks that demonstrated and used their cognitive abilities. The researcher created a list of behavioral and educational objectives that demonstrated these cognitive capacities prior to the investigation. The pupils were also assisted in remembering what they had learnt by the researcher's videos, signs, pictures, and data presentation.

Additionally, the researcher believes that the experimental group learned a great deal about international law and enhanced their handball refereeing abilities by using reputable specialized scientific sources and references when developing his educational curriculum, particularly by watching and listening to the lectures produced by the International Handball Federation on video.

The experimental group's ability to collaborate with the instructor and the Karplus model demonstrated their growth in international law studies and as a handball referee. This occurred because of the students' freedom to express their opinions, pose queries, and come up with answers. This is due to the researcher's belief that the Karplus model

"breaks the rigidity of learning between the teacher and the learner and opens up ways of communication in various educational and cultural forms".

The experimental group's performance as a handball referee improved, as did their reasoning and cognitive skills in international law. This was due to the proper planning and application of the educational curriculum elements, as well as the appropriate number of instructional hours (educational volume) and the appropriate ratio of hands-on practice to video presentation throughout the course. The reason for this is because, according to Mahmoud and Saeed (2011), the best approach to teach is by "organized planning and arrangement of it," which implies that the instructor must prepare ahead of time for the scientific assignments, how to utilize them, and what is required to complete them (p. 75).

In two areas—learning to draw conclusions and evaluating ability—the researcher discovered that the control group performed better on the post-test than the pre-test. This means that the control group followed the lessons and teaching methods that the subject teacher suggested to meet the educational goals for the third stage. As kids learn handball, their behavior changes every day, which helps them learn more in general. The study says this happens because of the lessons, the teacher, and the student's experience. This can happen to different degrees based on the teacher, how he teaches, and how the student reacts. Lastly, the increase in the control group was not as good as expected compared to the study group. The post-test scores for both groups showed that the researcher's independent variable had a big effect on how well the students did on the handball call-offs and the international law thinking tests.

CONCLUSIONS AND RECOMMENDATIONS

The Karplus model is a good idea. Some of my students are working on their law knowledge and their ability to draw conclusions from facts. Within the limits of the current study on student handball, the Karplus model proved to be better. The Karplus model had a big effect because it gave the experimental study group a great chance to use mental processes that made the student's part more interesting.

The researcher made several recommendations, which are as follows Emphasizing the importance of using the Karplus model in developing inferential thinking skills in handball and moving away from traditional methods that bring boredom and weak motivation towards learning, and using this model in other games. The need for change and diversification in teaching methods is of great importance in enriching the learning process. Emphasizing the importance of conducting development courses for physical education teachers to inform them of the latest strategies and train them on how to use them.

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