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Creative thinking and its relationship to cognitive and skill achievement in Volleyball among second-year students

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Abstract

Researchers in the education field, physical education and sports sciences have been interested in the subject of creative thinking and its applications as it is one of the important mental activities that influence the athlete's personality and determine his behavior in the environment in which he lives, with the belief that there is a clear impact of individual differences between individuals in the nature of the mental abilities that distinguish them from each other. The other. Since the Volleyball event is one of the important sporting events that attracts a lot of attention among students in colleges of physical education, and given the student's need to understand the nature of skill and cognitive performance through the basic vocabulary of the Volleyball subject, the importance of the research lies in how to achieve the best learning process from both theoretical and practical perspectives. Therefore, measuring creative thinking and knowing the extent of its relationship to cognitive and skill achievement. The problem of the research lies in the lack of a test for cognitive achievement in the subject of Volleyball. The need arose to work on building a test for this purpose through the use of precise scientific methods in order to address the basic research problem,

And skills in Volleyball. The aim of the study is to identify the relationship between creative thinking and cognitive and skill achievement in Volleyball among second-year students at the College of Physical Education and Sports Sciences - Kirkuk University.

The hypothesis of the study is that there is no statistically significant relationship between creative thinking and cognitive and skill achievement in Volleyball among second-year students. The researchers used the experimental method, and the sample was randomly selected from second-year students. Through the results, the researchers reached the **following conclusions**:

1. There is a relationship between creative thinking and cognitive achievement in Volleyball.

2.The students' interest in cognitive achievement was better than their interest in skill achievement in Volleyball.

The researchers recommended:

1.Emphasizing the importance of developing creative thinking in training in physical education colleges in Qatar, especially developing the cognitive and mental aspects of students.

2. Working to provide the appropriate psychological environment for students that contributes to creating opportunities for creativity and creative thinking for them in a manner consistent with the educational goals pursued by the educational curricula in Iraqi universities.

Keywords: creative thinking, cognitive and skill achievement, Volleyball.

1.Defining the Research

1.1Introduction and importance of the Research:

The researcher in the field of education, physical education and sports sciences was interested in the topic of creative thinking and its applications as one of the important mental activities that affect the personality of the athlete and determine his behavior in the environment in which he lives. With the belief that there is a clear impact of individual differences between individuals in the nature of mental abilities that distinguish them from each other, creative thinking remains one of the scientific data for these behavioral differences between individuals. This is what was confirmed by previous scientific studies that were concerned with studying the facts of such disparity and its relationship to the cognitive aspects of the athlete in this field, as the process of developing education is one of the important basic drivers for building generations through the optimal use of human and scientific capabilities, especially the creative ones in society, by caring for them and working to develop their talents according to advanced cognitive curricula that can provide the appropriate basis for scientific outputs that play their important role in society .

Studies and research in physical education, science and sports have paid great attention to learning methods in order to reach the best methods and approaches that are accompanied by high knowledge and experience from trainers and teachers in order to increase the learner's interaction with the lesson in a manner that is compatible with his general physical abilities to achieve educational goals and thus raise the level of learning, which led to the creation of modern methods

in learning and the pursuit of applying the best of them that enable the teacher to bring the learner to the best level of skill performance .

The study of creativity is an urgent and fundamental necessity for all human societies, including the sports community, despite the multiplicity of theories and literature that attempt to explain creativity on natural, practical, personal, psychological or genetic bases .

Creativity remains an important symbol and a distinct mental ability in the behavior that determines the personality of the individual. There is no doubt that sports, as a social phenomenon, adopt the concept of creativity in its general sense and creative thinking when performing, in particular, in the process of learning basic skills in various sports, especially volleyball, in terms of perception, interpretation and performance, with the belief in the importance of providing the opportunity to encourage every creative performance in the educational and sports fields, whether in training, sports competition or learning, and with the specificity of volleyball as a sports activity characterized by comprehensiveness in performance from the skill and cognitive aspects, which requires a clear understanding of the nature of performance to reach optimal performance. Since volleyball is an important sporting activity that attracts a lot of attention from students in colleges of physical education, and given the student's need to understand the nature of skill and cognitive performance through the basic vocabulary of volleyball, the importance of the research lies in how to achieve the best learning process from both theoretical and practical aspects. Therefore, measuring creative thinking and knowing the extent of its relationship to cognitive and skill achievement among those students can arouse the interest of many

researchers in the field of physical education for many reasons, foremost of which is the conviction resulting from the importance of studying thinking to solve problems, organize information, and improve performance outcomes through creativity, especially in volleyball. Thinking plays a prominent and influential role for the individual in making adaptations and activities that cannot be done effectively without it. As we know, creative thinking is one of the highest levels of cognitive processes because it is based on perception, and its use requires the individual to have mental activity that is more complex than the activity required from other levels. (Al-Zayoud, 1999, 117).

1.2 Research Problem :

In order to measure creativity and creative thinking, it was necessary to look for means and tools that can provide scientific service to researchers, perhaps the most important of which are the creative thinking test and cognitive and skill achievement tests that can lead to important scientific results that serve the scientific research process. Due to the lack of a test for cognitive attainment in the subject of volleyball, the need was born to work on the need to build a test for this purpose through the use of accurate scientific methods in order to address the basic research problem, which was determined in trying to find out what is the relationship between creative thinking and cognitive and skill achievement in the subject of volleyball in an effort to achieve a modest scientific increase added to previous research and studies in order to serve the mathematical movement and develop it forward.

3.1 Research Aims:

The research aims to:

-Measuring creative thinking, cognitive and skill achievement in volleyball students in the second stage in the Faculty of Physical Education and Sports Sciences - University of Kirkuk.

-Identifying the relationship between creative thinking and cognitive and skill achievement in the subject of volleyball among second stage students in the Faculty of Physical Education and Sports Sciences - University of Kirkuk

1.4 Research Hypothesis:

—There is no statistically significant relationship between creative thinking, cognitive and skillful achievement in volleyball among second stage students at the Faculty of Physical Education and Sports Sciences - University of Kirkuk.

1.5 Research Fields:

-Human field: Second stage students in the Faculty of Physical Education and Sports Sciences - University of Kirkuk for the academic year 2023-2024.

-Temporal domain: for the limited period between 5/11/2023 to 23/11/2023.

-Spatial field: The closed hall of the Faculty of Physical Education and Sports Sciences at the University of Kirkuk.

3. Research method and field procedures:

3.1 Research method: The researcher used the descriptive method in the interrelationship method for its suitability and the nature of the research.

3.2 The research community and its appoint: The research community included the second stage students in the Faculty of Physical Education and Sports Sciences - University of Kirkuk for the academic year 2023-2024, which numbered (100) students distributed into two academic divisions (A and B). In order to ensure the accuracy of scientific procedures in research, the research

community was classified into two second samples that were used for the purposes of building the cognitive achievement test in the subject of volleyball and by (60) students representing 60%, while the second sample was used for the purposes of the final application of the test and (30) students representing 30% of the research community. In order to ensure scientific conditions and the integrity of the test, the students of the exploratory trial, repeaters and postponers were excluded, who are (10) students.

3.3 Research Tools:

1 .Creative Thinking Scale (Brenst, 1989)

Several measures of creative thinking have been viewed and the researcher chose this scale from among several measures. This scale was designed by the scientist (Brenston, 1989). The scale originally consists of 74 paragraphs aimed at measuring creative thinking among individuals and the answer is by choosing one of three alternatives, which is (I agree, hesitate, I disagree). The total score of the scale ranges from (74-222) degrees, and (Al-Sarour, 1994) localized and tested the said scale in Jordan for the purpose of using it in research and studies in the Arab environment. Annex (1) (Al-Sarour, 2002,246-251).

-Exploratory experience: The exploratory experiment was conducted on a sample of (3) second-stage students who were excluded from the study. The purpose of the experiment was:

1. Identifying the suitability of the vertebrae prepared for this purpose.
2. The clarity of the paragraphs for the questioner.
3. Determining the time required to answer.
4. Make sure that the test results are clear.

5. Preparing the final image of the paragraphs before analyzing them statistically.

-Scientific qualities of the Brensten scale:

-Honesty: Honesty is the most important condition for a good test. The honest test is the one that succeeds in measuring what was put for it and distinguishes between individuals (Al-Zaher and others, 2002, 133)

The current standard enjoys a high coefficient of authenticity and stability through the scientific procedures it carried out (Brenston, 1989) to design the scale as well as other scientific procedures carried out by (Al-Sarour, 2002) on the Arab environment, but the researcher presented the aforementioned scale to a number of experienced and specialized experts in the field of educational, psychological and mathematical sciences, to make sure that it is valid to measure the purpose for which it was set in the Iraqi environment. To show their opinion on the validity of the paragraphs and make the appropriate amendments, the researcher adopted an agreement rate of 75% or more to accept the paragraphs, as he points out (Bloom, 1983) that the agreement of experts is higher if it is 0.75% or more, (Bloom et al., 1983, 126).

-Stability: The stability of the scale is meant to give the same results or similar results if it is reapplied again to the individuals themselves and under the same circumstances (Jagoub, 2002,245). The researcher used the test-retest method after (8) days from the date of its application to the number of (5) students. They were chosen randomly. The value of the stability factor reached (0.82). (Samara et al., 1989) indicates that the stability factor is high if it is (0.75) and more (Samara et al., 1989, 120) and in light of the above procedures, the scale is ready for application in the Iraqi environment.

-The key to correcting the creative thinking test tool. The researcher adopted the criteria originally determined in the test prepared by Al-Surour (1994) by giving the alternatives (I agree, disagree, hesitant) (3, 2,1) to the sequence, thus the total degree was limited between (74-222).

2. Cognitive attainment test in the subject of volleyball. Achievement tests are one of the most common and used evaluation tools. Students often obtain knowledge, understanding and skills related to the curriculum taught by students. The achievement tests aim to measure some forms of (mental) abilities, that is, what the person learned for knowledge or work, and in the field of study. These tests aim to measure the amount of what the student obtained from the contents of the subject of study subjects. They are mainly based on determining the cognitive level of students, that is, it suits the degree of each student. (Saleh, 2004,26).

To achieve the goal of research, which includes measuring the knowledge achievement of second-year students in the subject of volleyball, it was required to build a cognitive educational test in the subject of volleyball according to the curriculum scheduled for this subject by the Sectoral Commission for the Faculties of Physical Education and Sports Sciences in Iraq. The test was designed by the multiple choose method because it is one of the most stable scientific tests in the veracity of its provisions and estimating the grades achieved by students, and the objectivity and comprehensiveness of the subject and economic in time. The test consists of (40) paragraphs. The test is answered by choosing one alternative from three alternatives.(Al-Gharib, 1985, 203()

—Survey experiment of the test. The exploratory experiment of the test was conducted after the amendments made to the paragraphs according to the opinions of the experts on (3) students from the second stage in the Faculty of Physical Education and Sports Sciences, University of Kirkuk, and its goal was to:

1.To what extent the test paragraphs are clear.

2. Knowing the difficulties faced by students when answering.

3.Estimating the typical time of the answer.

- **Scientific bases of cognitive testing.**

- Honesty. Honesty is one of the basic conditions for judging the validity of the test, as the test is considered honest if it measures what was put to measure and distinguishes between individuals. (Al-Kholy, 1998, 72) To ensure the authenticity of the test, the following methods were used:

1. Apparent honesty. The researcher adopted apparent honesty, as Eble pointed out in this field that the best way to ensure the authenticity of the tool is for the number of specialists to decide the extent to which the paragraphs cover aspects of the attribute to be measured. (Eble, 1972, P.555).

2. The authenticity of the content. The test is honest when it is based on the subjects learned by students and is gradual in its difficulty and tests what students are expected to achieve at the stage they are in. Farr , 1970 , p.303)

The authenticity of the content aims to know the extent to which the test or measure represents the aspects of the attribute, adjective or ability to be measured.

— Stability of the test. Stability is one of the necessary indicators of the test because it means the extent to which the test measures the true amount of the feature it aims to measure. (Alam, 2000, 131). There are many methods for

extracting stability and the best methods in objective achievement tests is the use of graphical methods. The researcher used the Coder-Richardson 20 equation (K20) because it deals with the answering tests (0-1) (Al-Nabhan, 2004, 247). The researcher analyzed the students' responses by applying the equation to the obtained data, as the stability coefficient reached (0.83), which indicates that the test has a high stability coefficient.

— The key to correcting the cognitive achievement test instrument in volleyball: Since the achievement test paragraphs are objective and from the type of triple alternative multiple test, the researcher gave one score for the correct answer, while the wrong answer gave it zero and thus the degree was limited between (0-40) and the question is called Mtna and the answers are alternatives (Elhem, 2000, 212).

— Skill achievement test. They are tests that measure the individual's practical performance and depend on measuring the evaluation of what the student provides of practical performance in fact. They are used in most fields of study and are used in colleges that rely on practical performance. Al-Mahir and others, 2002,62). The researcher was accredited in the test of skill achievement in the subject of volleyball, which is approved by faculty members in the Faculty of Physical Education and Sports Sciences at the University of Kirkuk, namely:

1. Transmitter test (degree).
2. Skill performance test (degree).
3. Crushing beating test (degree).

The results of these tests were calculated according to the method imposed within the approved calendar curriculum.

— The final application of the tests. After completing the procedures necessary to prepare the creative thinking scale and cognitive and skills tests to measure cognitive and skill achievement, the tests were applied to the second stage students in the Faculty of Physical Education and Sports Sciences for the period from 6/11/2023 to 16/11/2023 and as follows:

1. The Brenston Test of Creative Thinking was applied on 6-7/11/2023. The vocabulary of the Creative Thinking Scale was presented to the students of the research sample and it was explained to them how to answer the scale.

2. The cognitive achievement test in volleyball was conducted on students on 9/11/2023.

3. The skill achievement test was conducted for the period from 12-16/11/2023 in volleyball.

3.4 Statistical means: The researcher used statistical means according to the ready-made statistical bag SPSS.

4. Presentation and discussion of the results.

—Creative thinking and its relationship with cognitive attainment in volleyball.

The relationship between both variables was studied through correlation and regression. It was found that there was a positive and highly moral correlation relationship between creative thinking and cognitive attainment, as the value of the correlation coefficient between them amounted to 0.50. As for determining the relationship between them through regression analysis, linear and non-linear regression was used for this purpose and found that the linear regression equation was to determine the relationship between (creative thinking) and (cognitive attainment) was an equation of the first degree $\hat{y} = B.143 + 0{,}1875x$

with a determining and observed coefficient $\overset{2}{R} = 25{,}4\%$ from the F test, which is illustrated in Table 5.5036 r=

Table (5) Analysis of the regression variation between creative thinking, cognitive attainment and the regressive equation of the first degree

F quality	Degree of unrestraint	Amount of Squares	Average of squares	Contrast
9.855**	1	161.149	161.149	Slope
	29	474.206	16.352	Remnants
	30	635.355		Total

**Morale at an error rate of 0.05%. It is clear from the above table that the regression relationship was high at a probability level of 0.01%, as the calculated value of (P) reached 9.855, which confirms the mentioned relationship, which is greater than the value of (P), which is (4.18) in front of the degree of freedom $(1-29)$ at an error level of 0.05%, and despite that, a second-degree slope equation was found between the two variables and was in the coefficient to determine the table (5) R = 0.5036

Table (6) shows the analysis of the discrepancy variance between creative thinking, cognitive achievement, and the second degree sloping equation

F Quality	Degree of unrestraint	Amount of squares	Average of squares	Contrast
6.9575**	2	210.926	105.463	Slope

	28	424.429	15.158	Remnants
	30	635.355		Total

Moral at 0.05% error. From Table (6) and after balancing the calculated value of (P) with the value of (P), which amounts to 3.3404 at the degree of freedom (2-28) and the level of significance 0.05, this shows the importance of the equation of the second degree in the annihilation of the approved variable, as well as continuing using an equation of a higher degree and testing it, and found that the equation of the third degree was: and with a determining factor and this indicates that the increase of the third degree was It has an effect on the changes in cognitive achievement by approximately 0.7 than in the case of the second degree, as shown in Table (7)

Table (7) Analysis of the variation of regression between creative thinking, cognitive achievement, and the third degree sloping equation

F Quality	Degree of unrestrain	Amount of squares	Avarge of Squares	Contrast
6.151**	3	257.948	85.9825	Slope
	27	377.407	13.9780	Remants
	30	635.355		Total

** Morale at an error rate of 0.05%. It was observed from Table (7) that the third degree regression equation was significant at a probability ratio of 0.01, as the calculated value of (P) reached 6.151, which is greater than the value of (P), which is 2.9604 at freedom (3-27), and as a result of the importance of the third

degree equation in predicting cognitive achievement, it was stopped, and Figure (3) shows the nature of this relationship between thinking Creative and cognitive achievement.

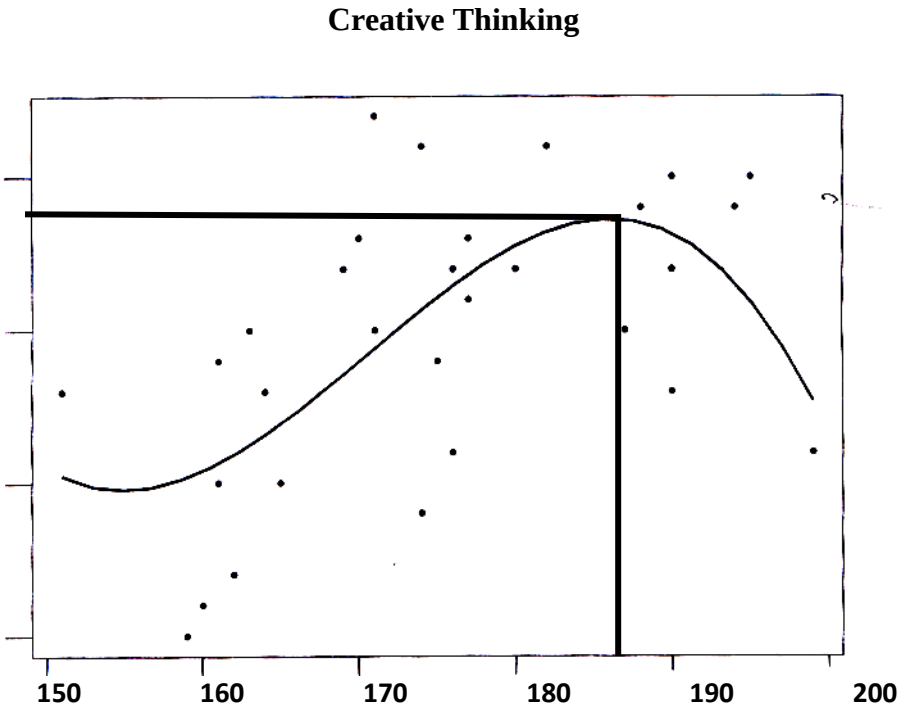

Figure (1) shows the marginal relationship (of the third degree) between creative thinking and cognitive achievement

he diffusion form depicted from the results of the table can give us an expectation or prediction for the estimates of the players, as it is clear from Figure (3) the highest achievement obtained at 188 degrees, i.e. the higher the students 'degrees from the hypothetical medium, the higher the relationship and the researcher attributes this result to the ability of students to express their willingness to practice creative thinking through the situations they pass through which are important mediator In providing the scientific relationship between these two variables, as the student's willingness to carry out the cognitive tasks required by the nature of performance in general, especially in theoretical lessons in which he participates, including volleyball. This study concluded between creative thinking and cognitive achievement that theoretical lessons, which represent an important effort from the learner in obtaining knowledge and information through the mathematical environment that depends on the practice of creative thinking in a broad way and that is consistent with what he indicated, and through scientific analysis of theories of creativity in psychology and which is trying to explain its outputs and the results of the current research, we find that (Guilford) has indicated such a relationship in its modeling The mental structure (1956), which distinguished between mental processes and the content and results, depending on that type of each of them up to the evaluation and the issuance of judgments in light of previous experiences and knowledge and in the same direction, the behaviorists in their interpretation of creativity went further in determining the relationship between creative thinking and the cognitive aspects of the human being and this is also consistent with what he went to (Mednick) and that is what they call the results The current that the researcher reached in his scientific direction, such as supporting the behavioral trend in the interpretation of creativity, which indicated that the creative thinking process aims to reach new formations with certain specifications that are useful and the value of meaning, as there are links that show a number of stimuli and

responses and whenever the relationship or link between stimulus and the response is strong, this is evidence of the high level of creative thinking. Lefrancois, 1982,226).

- Creative thinking and its relationship to skill achievement. The relationship between the two variables was studied through the correlation and regression, and it was found that there is no correlation between creative thinking and skill achievement, as the value of a correlation coefficient between them reached 0.06 As for determining the relationship between them through the decline, he used the linear and non-linear regression for this purpose and found that the linear regression equation to determine the relationship (creative thinking and the deserving of the skill achievement) was: by determining coefficient, As shown in Table (7).

Table (8) shows the analysis of regression variance between creative thinking and skill achievement and the second-degree regression equation.

F Quality	Degree of unrestrain	Amount of squares	Avarge of squares	Contrast
0.1055	1	1.754	1.7542	Slope
	29	482.181	16.6269	Remants
	30	483.935		Total

It is clear from Table (8) that the sliding relationship was not significant at an error rate of 0.05, as the calculated value of (P) reached 0.1055, which is smaller than the value of (P) at the degree of freedom $(1-29)$ of 4.1830, and this is confirmed by the mentioned relationship, and despite that, a second degree slope equation was found between the two variables and was: $\hat{Y} = 106.016 - 1.0041X + 0.0029x^2$ and with a determining factor $\overset{2}{R} = 1.6\%$ As illustrated in table (9)

Table (9) Analysis of regression variance between creative thinking, skill achievement, and the second degree sliding equation

F Quality	Degree of unrestrain	Amount of squares	Avarge of squares	Contrast
0.2347	2	7.978	3.9889	Slope
	28	475.958	16.9985	Remants
	30	483.935		Total

It is clear from Table (9) that the relationship was not significant at a probability ratio of 0.05, as the calculated value of (P) was 0.2347, which is smaller than (P) of the tabulation of 3.3404 at a degree of freedom (2−28) and this shows the importance of the second degree in predicting the approved variable, as well as continuing the equation from a higher degree and testing it and found that the equation of the third degree was:

$\hat{Y} = 3201.31 - 54.3899X + 0.3088X^2 - 0.0006X^3$ and by a determining factor $\overset{2}{R} = 11.1\%$

This indicates that the third degree regression equation has no effect on the changes in skill achievement by approximately 10% from what it was in the event of what it was in the case of the second degree regression equivalency, and when testing the value of (P)

Table (10) Analysis of the variation of regression between creative thinking, skill achievement, and the third degree sloping equation Table (10) Analysis of the variation of regression between creative thinking, skill achievement, and the third degree sloping equation

F Quality	Degree of unrestraint	Amount of squares	Average of squares	Contrast

1.1274	3	53.873	17.9575	Slope
	27	430.063	15.9283	Remnant
	30	483.935		Total

It was observed from Table (10) that the third degree regression equation was not significant at a probability ratio of 0.05, as the calculated value of (P) reached 1.1274, which is less than the value of (P) at the degree of freedom (3-27), which is 2.9604, and the result of the importance of the third degree equation in predicting skill achievement has been stopped, and Figure (4) shows the nature of this relationship between thinking Creative and skillful achievement.

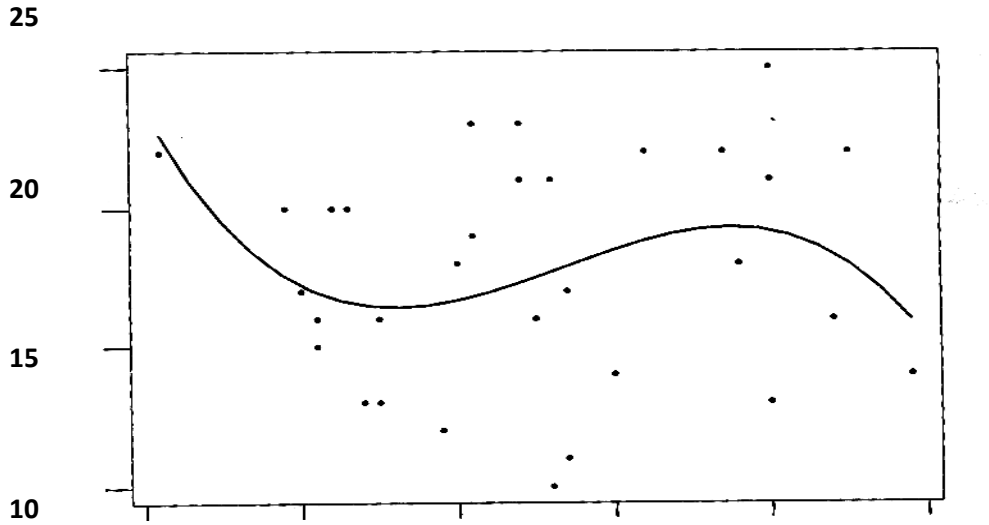

Figure (2) shows the marginal relationship (of the third degree) between creative thinking and skill achievement

It is clear from Figure (2) when creative thinking was low, the relationship was high, and this explains the absence of a relationship between creative thinking and skill achievement, and a dispersion occurred in the relationship (high and low) and the researcher attributes the previous results to the nature of skill performance in

volleyball requires high speed and quick responses in performance, especially in the psychological conditions accompanying the evaluation process that leads the student to take care of the implementation of the motor and skill task What is required of him as soon as possible for a short period without paying attention to thinking about creativity when testing, which caused a weak relationship between creative thinking and skill achievement in volleyball and can give the researcher a logical explanation for the lack of the relationship between these two variables from their basic and psychological needs, up to self-realization in the evaluation process, that the conditions of performance and its nature and the method of evaluation may not satisfy the psychological desires of Students and do not make them feel the realization of themselves, which caused the results of the situation, and that is in line with what (Maslow) came in in his theory of needs, in which he explained that self-realization is the pinnacle of achieving human needs among individuals through their sense of independence, control and performance control, which was not achieved due to the conditions of the objective evaluation in the achievement test of volleyball skills and used at the end of the school year, as those conditions It does not provide an environment suitable for creativity, but the capabilities of the majority will be limited to passing the skill test to achieve success, and that this evaluation may not necessarily be subject to the conditions of sporting competition that lead to creative thinking when performing. The current results are also consistent with the behavioral direction in creative thinking (Skinner), which indicates its dependence on the principle of reinforcement and reward when performing, according to which it becomes unwanted thinking with the loss of both previous conditions, and this is confirmed by the researcher's interpretation of the results of her research, which were conducted in circumstances that do not depend on the principle of reinforcement and reward, and that is consistent with its previous interpretation of the results current. This is in line with Ray Guilford on the importance of the

environment to develop the capabilities of creative thinking and that the individual cannot produce creative production unless the environment provides him with appropriate opportunities to present those results (Abdel Ghaffar, 1977,179).

5.Conclusions and recommendations.

5.1 Conclusions:

1. There is a relationship between creative thinking and cognitive achievement in volleyball
2. . The interest of students in cognitive achievement was better than their interest in skillful achievement in volleyball.
3. Through the skill tests used in the current research in the skill collection of volleyball, it is not necessarily related to creative thinking due to its nature and the specificity of the skill performance required in the evaluation process used in stabilizing the achievement degree.

5-2 Recommendations:

1. Emphasizing the importance of developing creative thinking in training in the colleges of physical education in Qatar, especially the development of the cognitive and mental aspects of students.
2. Working to provide the appropriate psychological environment for students, which contributes to creating opportunities for creativity and creative thinking for them in line with the educational goals that educational curricula seek in Iraqi universities.
3. Using the cognitive achievement test in theoretical exams in other universities and colleges.

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Appendix (1)

Fit after modification	Not Fit	Fit	Item	Ser.
			always study and I am sure that I follow the correct procedures in solving my academic problems.	1
			It will be a waste of time for me if you ask questions and not hope to get answers to them	2
			I focus seriously on the things that interest me more than most students.	3
			. I feel that the step-by-step logical method is best for solving problems.	4
			Sometimes I can vote for the group that tries to find the effectiveness of some students.	5
			I spend a long time thinking about what others think about me.	6
			very important to do what I think is correct, more than trying to win the satisfaction of others..	7
			Students who seem unsure of things lose my respect for them.	8
			I need more important and enjoyable things than others.	9
			I know how to monitor my inner feelings.	10
			I can endure problems for long periods of time..	11

			Sometimes I get excited about things .	12
			I often have the best ideas when I don't do something specific..	13
			I rely on my inner feelings and my guesses in right and wrong when I . am in the process of reaching out to solve the problem.	14
			When I solve the problem because it is fast at work when analyzing . the problem, but I am slow to compose the information I collected	15
			Sometimes I get fired because of my breaking of instructions and doing things that I don't have to do.	16
			I love hobbies related to collecting things.	17
			Daydreaming has helped many of my important projects..	18
			like objective and logical students	19
			I if I have to choose between two professions other than my current . profession to be a doctor, to be a teacher.	20
			I can deal easily with individuals if they belong to the same social and scientific level as I belong to	21
			I have a high degree of sensitivity to beauty..	22
			I walk to reach a high level and strength in life..	23
			I love people who are more confident in their conclusions.	24
			Inspiration has nothing to do with solutions to the right problems.	25
			When I participate in an argument, what makes me most happy is if . the opponent of mine becomes a friend, even if it is at the expense of sacrificing my point of view.	26
			I am more interested in introducing new ideas than trying to put it on . others.	27
			I enjoy spending the day alone with my thoughts.	28
			I tend to avoid situations in which I feel an intruder	29
			when I value information, because I care more about its source than its content.	30
			Rejecting unpredictable and unpredictable things..	31
			the rule (work before pleasure)	32

			respecting the individual for himself is more important than . respecting others for him.	33
			I feel that the individuals who struggle to reach perfection are not wise.	34
			It is better to work from others in a team instead of working alone..	35
			I love work that requires affecting others	36
			many of the problems that I face in life that cannot be solved in light . of the right or wrong solution	37
			It is important for me to have a place for everything and for . everything to be in place.	38
			The writers who use strange and unfamiliar words often want to show . off.	39
			Students who tend to enjoy impractical ideas..	42
			I enjoy what I don't know more than what I know.	43
			I care more about what could be more than what exists.	44
			I often review myself about the things I said that may have hurt the feelings of other individuals.	45
			I Enjoy manipulating new ideas even with practical use of them.	46
			I do not like to ask questions about which there is no interest.	47
			When did I take up work on a project, I strive diligently and are determined to accomplish it even under conditions of frustration.	48
			. Sometimes I feel that ideas come to me from an external source, as if I am not directly responsible for them.	49
			Sometimes I fall into trouble because of curiosity.	50
			People often say that I am absent from mind.	51

			I tend to express my feelings more than other people do.	52
			It is easily to change my interests so that I can work in a specific field.	53
			. students who work with theories are less important than those who are practical.	54
			. When a group puts many ideas in a place, I will be the most able to present more ideas quickly.	55
			I am not ashamed of changing my interests in the other sex.	56
			I can easily give up quick or quick to gain in order to reach my goals	57
			individuals who express their feelings and emotions they either be direct or unstable	58
			. in dealing with people, it is important that you be more diplomatic than open and direct.	59
			Analysis of the mistakes of others is a waste of time..	60
			. It is not wrong to show off a little in front of others from time to time.	61
			Sometimes I enjoy a lot of deceitful ingenuity that I wished to survive.	62
			When a person tries to stand in front of me in the queue, I feel in his footsteps	63
			. the problems that do not have a clear line and the possibilities of a clear answer that do not require my attention	64
			The concept of life attracts me and gets my attention..	65
			. . I trust my feelings to lead me in my experiences.	66
			. Sometimes I start working on a problem that I felt, but I haven't heard it yet.	67

			. The things I said are old and familiar seem sometimes strange to me and unusual.	68
			Sometimes I tend to forget things like names and people, streets, highways, small countries ... etc.	69
			. During my teenage period I had a desire to be alone and achieve my thoughts and interests.	70
			I feel that hard work is the main factor for success.	71
			.ا Many creative works are the result of chance factors.	72
			. I care a lot to be considered an important member of the team.	73
			. I was very happy in my childhood.	74

Appendix (2) Princeton Test of Creative Thinking in its final form

Read carefully and choose one of the following alternatives (agree, undecided, disagree) and put a check mark under what did you suit

disagree	hesitate	agree	Item	Number
			Sometimes I follow correct and unfamiliar ways to solve my study problems	**1**
			I wish I could get answers to all the questions in my mind	**2**
			some activities attract me more from other student.	**3**
			I can solve my problems if I follow a logical, step-by-step .approach	**4**
			.I spend a lot of time thinking about solving my problems	**6**
			. I do what I think is right and I don't care what others think.	**7**
			. Students who seem unsure about things lose my respect.	**8**
			.I need important and enjoyable things more than others	**9**

			I know how to watch my inner feelings	10
			I can handle long-term problems	11
			Sometimes I am very enthusiast	12
			I rely on my gut feelings and guesswork when it comes to solving a problem.	14
			I take my time organizing the information I collect to present it in the best possible way.	15
			I sometimes get criticized for not following instructions.	16
			I like hobbies about collecting things	17
			Deep thinking helps me a lot in solving my problems	18
			like serious and objective students.	19
			If I had to choose between two professions other than my current one, I would prefer to be a doctor than a teacher.	20
			I can deal more easily with people if they are on the same social and professional level as me.	21
			I have a high sensitivity to beauty.	22
			I am a prisoner to reach the high level and power in life	23
			I like people who are more confident in their conclusions.	24
			Inspiration has nothing to do with solving the right problems.	25
			When I get into an argument, what makes me happiest is when my opponent becomes my friend, even if it means sacrificing my own point of view.	26
			Care to present new and unfamiliar ideas	27
			I enjoy thinking alone	28
			tend to avoid situations where I feel like I'm an intruder.	29
			I.Evaluate information from its source	30
			I.Reject things that are uncertain and unpredictable	31
			I like people who follow the rule (serious people).	32
			Self-respect is more important than the respect of others.	33

			. feel that people who strive for perfection are unwise	34
			.I prefer to work with others rather than aloneوحدي	35
			. like work that attracts the attention of others؟	36
			.I can't solve many of the problems I face in life لا	37
			I like everything to be in its place and for there to be a place for .everything	38
			.I love reviewing new, weird and unfamiliar books	39
			The problem with many students is that they take things too .seriously	40
			I can maintain my motivation and enthusiasm for many sporting achievements even in the presence of frustrations and .obstacles	41
			.Students who tend to enjoy ideas are impractical	42
			.I like the new and unfamiliar thing	43
			.Focus more on what could be than what is	44
			.I often check myself when I hurt others' feelings	45
			Have fun playing with new ideas even when there is a practical .use for them	46
			.I don't like to ask questions that show disinterest	47
			Whenever I take on a project, I strive to succeed and overcome .obstacles	48
			.Sometimes I have thoughts that are beyond my control	49
			People often say that I am absent from mind.	51
			I express my feelings and emotions more than other people do	52
			It is easier for me to change my interests to work in a certain .field, than it is to change my job in order to satisfy my interests	53
			students who work with theories are less important than those who are practical.	54
			I’m not shy in showing my interest in the other sex	56
			I don’t give up on my goals in life despite the difficulties I face	57

			We have to be more diplomatic in dealing with others	59
			I feel I waste my time when I analyze the mistakes of others	60
			It is not a fault to show off in front of others from time to time	61
			I really enjoy winning a trickster	62
			Be away from cloudy issues	64
			The life attracts me and gets my priority	65
			I trust my feelings to strength my experiences	66
			When I feel that there is a problem I tend to solve it	67
			I like everything new and unfamiliar	68
			During my childhood I tend to be alone to achieve my interest and thoughts	70
			I feel that handwork is the key to success	71
			Many creative works are an outcome of coincidence	72
			I really care about being an important person in the team	73
			I was very happy during my childhood	74