THE EFFECT OF SPECIAL EXERCISES ACCORDING TO A DESIGNED DEVICE IN DEVELOPING THE PERFORMANCE OF A KINETIC CHAIN ON THE BALANCE BEAM DEVICE

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Abstract

The purpose of this paper is to designing a multi-purpose device to develop the performance of a kinematic chain on the balance beam device and knowing the effect of special exercises on the experimental research sample in developing the performance of a kinetic chain on the balance beam device for female students. The researcher used the experimental method to suit the nature of the research**.** The research community was determined by the intentional method, and they are the third-stage female students in the College of Alsalam, Department of Physical Education and Sports Sciences, Divisions (C, D), and their number is (20). As for the research sample, it was chosen by the intentional method of female students practicing artistic gymnastic skills, whose number is (20) female students, where the percentage of the sample represents (100%) from the community. The researcher used the method of the control and experimental groups with two pre and post-tests. One of the most important results reached by the researcher is that: The effectiveness of special exercises associated with the multi-purpose designed device and its positive impact on the development of coordinating abilities of the experimental group, and the results showed that there were statistically significant differences between the pre and post-tests and in favor of the post-test in the harmonic abilities of the experimental group under study. One of the most important recommendations recommended by the researchers is that : Applying special exercises according to the device designed for students and for different stages, need for workers in the field of teaching rhythmic gymnastics to pay attention to the use of devices that help increase kinetic mastery of rhythmic gymnastics skills , need to use this multi-purpose device designed by the Iraqi Federation of Gymnastics, and using these exercises on other age groups and using them with the training samples of the Iraqi Central Gymnastics Federation and the national teams

Keywords: Designed device. Artistic gymnastics. Balance beam.

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Introduction

Sports training scholars point out that the training process is the process of increasing human information, improving ability, solving problems, and adapting to changing lives, and it does not stop at certain limits. The result of evolution in all spheres of human life. The training process has made huge strides on all levels. Therefore, scholars and researchers participating in the training process, including academics, professors, and trainers, are required to constantly seek to develop methods and methods of training to achieve the objectives of the training process, especially through a continuous organization (planning) and application. Evaluation and development of training methods. It decides what must be achieved and then determines the application process and how to reach the goal. Through evaluation, we understand the strengths and weaknesses to strengthen the positives, correct the negatives, or develop, which is essential and certain. The diversity of knowledge fields and the scientific overlap between them contribute to the training process. The gymnastics sport depends on the correct technical performance of the skills in a big way, especially the skills on the balance beam device, which, in addition to performing the skills, needs balance and accuracy in the movement to avoid falling from the crossbar. Teaching, mastering and developing this skill and performing it in the correct form enables the performers to perform the skills of higher difficulty and from the same group. The importance of the research lies in the design of special exercises according to a designed device that is a substitute for the legal devices used by the professors of the subject, in which it is very difficult to complete the stages of learning rapid performance and controlling kinetic performance, especially among female students of the Faculty of Physical Education and Sports Sciences, University of Alsalam, which prompted the researcher to manufacture And the use of a multi-purpose designed device to contribute to the development of the performance of a set of skills on the balance device called (kinetic chain) on the balance beam device and shorten the time in the process of teaching and developing the level of performance, as the designed device gives the student an incentive to overcome the wrong path of skill by increasing the strength of the legs and agility in mobility is in addition to balance and works to develop the performance of students and maintain the correct path of skill and reduce errors. Accordingly, the importance of the research lies in knowing the effect of special exercises according to a device designed by the researcher on developing and improving some artistic gymnastics skills on the balance beam device, if the designed device creates the appropriate conditions and proves the kinetic track for performing technical skills through repetitions and reducing the effort of the learner and the teaching. The researcher, as one of the doctoral students and a follower of the artistic gymnastics game for female students, noticed the students' fear of practicing the gymnastic movements in the third stage, due to a large number of skill requirements on the device and the fear of injury due to the height of the device, and what each of its six devices requires physical and psychological strength to perform its relatively difficult skills in this stage; Where the skills are difficult on each device, and more difficult skills are given than the second stage in terms of their difficulty, complexity, and linking movements in them, especially those applied to the balance beam device, and because of the age of the students, their weight, and the weakness of their fitness components such as trunk flexibility, balance, agility, the strength of the legs, and the difficulty of manual assistance through the school. This prompted the researcher to manufacture a device designed to develop the performance of a kinematic chain on the balance beam device.

Research Objective

Designing a multi-purpose device to develop the performance of a kinematic chain on the balance beam device

- Knowing the effect of special exercises on the experimental research sample in developing the performance of a kinetic chain on the balance beam device for female students

Research Hypotheses

- The use of special exercises positively affects the development of artistic gymnastics skills on the balance beam device of the experimental sample of female students.

- By reviewing previous related studies such as the study of (Kazem, and Shehab. 2011), where they concluded the effectiveness of using stretching exercises in improving the flexibility of the spine and the dynamic thigh, and from developing the technical performance of the chosen research skill, while (Iyad Saleh) concluded Salman and Susan Salim Dawood) that the use of the five-way Baybee strategy with the right and left pattern are the best in learning from the strategy used by the teacher (Salman and Dawood, 2020).

Research Methodology and Field Procedures

Research methodology

The researcher used the experimental method to suit the nature of the research**.**

Community and sample research: The research community was determined by the intentional method, and they are the third-stage female students in the College of Alsalam, Department of Physical Education and Sports Sciences, Divisions (C, D), and their number is (20). As for the research sample, it was chosen by the intentional method of female students practicing artistic gymnastic skills, whose number is (20) female students, where the percentage

of the sample represents (100%) from the community. The researcher used the method of the control and experimental groups with two pre and post-tests. As all the students perform the pre-tests, then the exercises are applied with the assistive device on the experimental sample, after which they are tested with the post-tests (Table 1).

Although all the female students are beginners and did not practice the skill in the subject of the research previously, the researcher carried out the procedure of homogeneity in order to ensure that the two groups are equal and that the two groups began to learn the research skill from one initiation point.

The researcher used a set of used tools and devices, information collection methods, scientific sources, the international information network, personal interviews, observation, tests and measurements related to evaluating skillful performance on the floor device, the program (SPSS) version (18) for statistical treatments, and a video camera.

Scientific basis for the tests

In order to reach the most accurate results and in order to ensure the validity of the tests, the researcher must subject the tests to the scientific foundations of honesty, reliability and scientificity (Muhammad , 2000).

Validity of the test: The researcher used virtual validity, and this procedure is considered valid for the test, as the test can be considered valid if it was presented to a number of specialists in the mathematical field that the test measures, and they judged that it measures what was set to be measured efficiently (Al-Imam, and et.al. (1990) Where the researcher presented the harmonic tests to the experts and specialists in the sports field, and their agreement about their validity ranged from 80-100%, as shown in table 2, to ensure their validity.

Stability: Stability is "consistency in the results and it is considered stable if we get the same results from it when applied to the same individuals and circumstances (Majeed. (1989). Reliability was calculated using the repetition method, taking advantage of the results of the exploratory experiment if the correlation coefficient values ranged between (0.78 - 0.83), which are high values that indicate the stability of the test results (Table 2).

Objectivity: Means freedom from bias or fanaticism and not introducing personal factors to the tester such as his opinions, whims, personal tendencies, and even his bias or intolerance. It means to describe the capabilities of the individual, as they really exist, not as we want them to be (Fttah Anan. (1995).

The researcher conducted the exploratory experiment on a sample from outside the research sample, which was represented by the students of the College of Physical Education and Sports Sciences / third stage, and their number is 4 students, and they are students of Division (A), and they were chosen by the intentional method and on 14/4/2022 and prepared on 13/4/2022 .Design of the assistive device: After the researchers set the correct measurements for the device in a way that suits the method of teaching it to young people according to the subject performance and the special exercises used, the device was designed and used in the skill under study as follows:

Components of the auxiliary device used: The material of the device is iron. The shape of the device is a rectangle consisting of four sides. Each side has its own shape and its own goal of training

- The first side consists of two boxes on both ends with dimensions (50 * 50 * 40) cm and a balance beam of 2.5 m length, 10 cm width and 5 cm height connects between them. It is fixed on both ends with an iron box at a distance of 10 cm from the outer end, and on the other end a tape is installed at a distance 5 cm from the inside on the box, and a width of 5 cm. Made of linen, it can bear up to 140 kg of weight, and this crossbar is 40 cm high from the ground as shows in the figure 1 (Figure 1).

- The second side, which is made up of two boxes on the side with dimensions (120 * 50 cm) and a height of 40 cm between them are two parallel sides. Each side contains three panels inclined at an angle of 45 degrees and the dimensions are 30 X 25 cm. These panels are not opposite the second, the first side from the outer side is a distance away 20 cm from the box, then the first panel, then a distance of 50 cm, then the second panel, then 50 cm, then the third panel, then 55 cm to the box, and the opposite side is the same procedure, but in the opposite way, that is, it begins by leaving 20 cm from the other side of the box as shown in figure 2 (Figure 2).

- The third side is made of two boxes of different sizes on the side, the first is a square measuring (50 * 50 * 40 cm) and the other (120 *50 * 40 cm) is installed on the inner side, tools for fixing the board in two different levels, the first level at a height of 20 cm from the ground and the second height at a distance of 40 cm From the ground, the width of the board connecting the two boards is (1 m), and it is movable and subject to change from one height to another as shown in figure 3 (Figure 3).

- The fourth side the third side consists of two boxes of different sizes on the side, the first is a square measuring (50 * 50 * 40 cm) and the other (120 * 50 * 40 cm) is installed on the inner side of each column box with a height of (1.5 m). This column contains openings on The form of a ring through which poles can be installed horizontally, each ring separated from the other at a distance of 5 cm as shown in figure 4 (Figure 4).

The validity of the device to develop the skill was confirmed by taking into account the opinions of gymnastics experts, who confirmed that the proposed

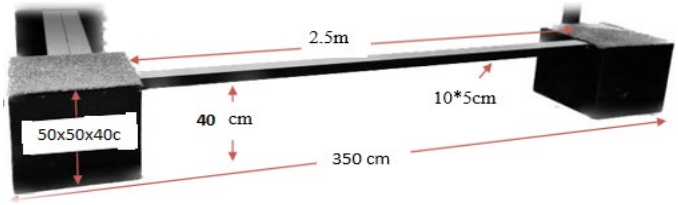

Figure 1: Shows the first side.

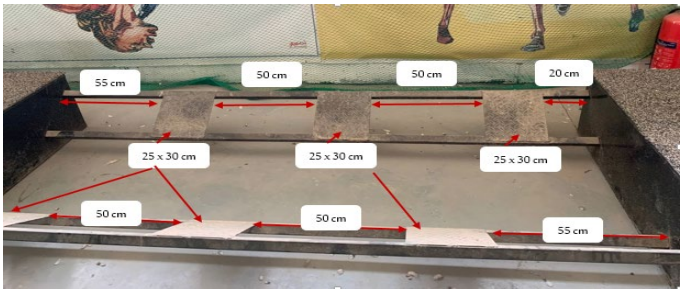

Figure 2: Shows the second side.

Table 1: Shows the arithmetic mean, standard deviations, mode, and torsion coefficient of the sample.

Variables	Measuring unit	Number	Mean	Std. Deviations	Mode	Skewness
Length	Cm	20	166.89	5.165	165	0.092
Mass	Kg	20	62.67	4.876	60	0.330
Age	Year	20	21.70	0.791	20	0.602

Table 2: Shows the significant differences between the pre and post-test of the two research groups in the skill of the balance beam.

Skills	Groups	Pre-test		post-test		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Individual ascension balance	Experimental	0.910	0.427	8.110	0.563	107.647	0.010	Sig
	Control	0.885	0.348	6.235	0.657	46.459	0.010	Sig
Front roll on the bar	Experimental	0.455	0.352	7.451	0.426	47.374	0.020	Sig
	Control	0.510	0.363	5.325	0.766	35.206	0.020	Sig
landing	Experimental	0.435	0.373	7.175	0.613	57.427	0.030	Sig
	Control	0.385	0.368	5.276	0.829	29.065	0.030	Sig
* Significant ≤ 0.05 at n-2 degree of freedom = (18).								

Table 3: Show the significant differences between the experimental and control groups in the post-test, to perform the balance beam skill.

Skills	Groups	Post-test		T value calculated	Level Sig	Type Sig
		Arithmetic mean	Standard deviation			
Individual ascension balance	Experimental	8.110	0.553	9.457	0.010	Sig
	Control	6.235	0.687			
Front roll on the bar	Experimental	7.451	0.476	10.376	0.010	Sig
	Control	5.335	0.776			
landing	Experimental	7.175	0.613	7.292	0.010	Sig
	Control	5.275	0.819			
* Significant ≤ 0.05 and degree of freedom = (18)						

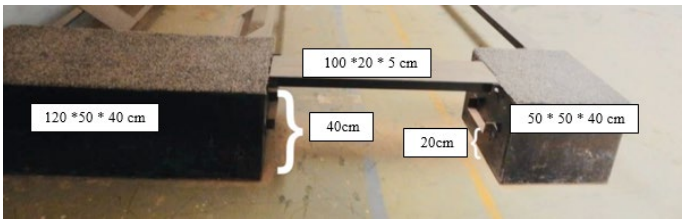

Figure 3: Shows the third side.

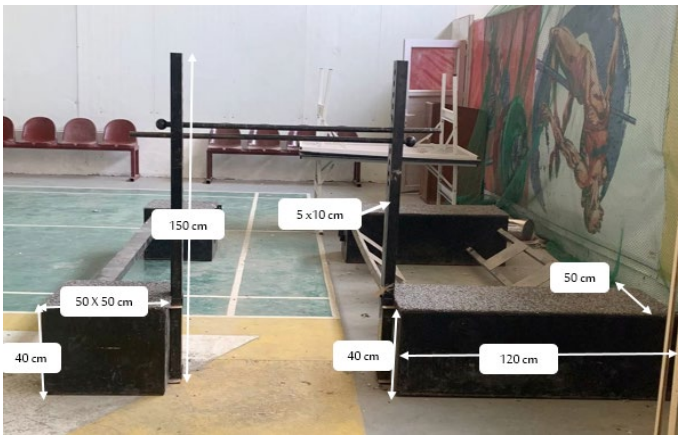

Figure 4: Shows the fourth side.

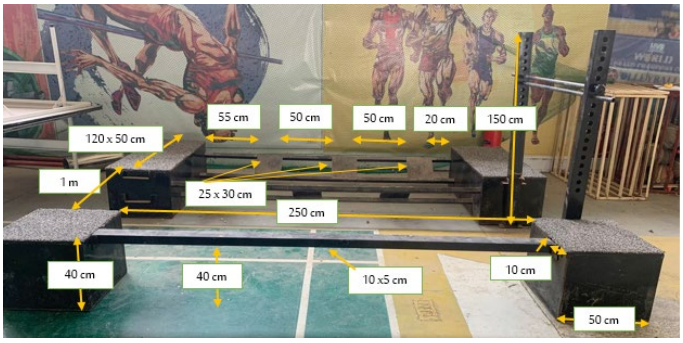

Figure 5: Shows the manufactured device, method and performance on it.

assistive device works in the correct manner. Some of the skills of the balance beam apparatus were identified based on the vocabulary of the University College of Alsalam / Department of Physical Education and Sports Sciences, which was prepared for the first semester, and the skills were: Invalid source specified, and the front open and the back open Invalid source specified, which is one of the easiest gymnastics movements (Figure 5).

Before starting the pre-tests, the researcher applied one introductory unit to the experimental research sample for the purpose of introducing the students to the skills to be tested present it to experts for evaluation.

The researcher prepared special exercises according to the device designed, the researcher designed these exercises in proportion to the gymnastic skills used in the research, and the researcher introduced the skills on the balance beam device and used them in the main part of the lesson. The main experiment was implemented during (8) weeks, with (3) educational units. Each week, to be a total of (24) educational units for the experimental research group, and the main part of the section was used to perform the exercises for (10) minutes to explain the educational aspect of each unit, while the practical side was (15) minutes in which the students will apply the special exercises. Post-tests were conducted within a week after completing the implementation of the educational units, and the researcher took into account that the post-test conditions are similar to the pre-test conditions in terms of time, place, test method and the auxiliary work team in order to achieve accurate results.

The performance of the artistic gymnastic skills (kinetic chain) that was used in the research was evaluated after photographing and presenting it to four experts in the field of artistic gymnastics with a range of (0 to 10) degrees for each skill. From the scores of the evaluators, then the remaining two degrees were collected and divided by (2) to be the final score for the purpose of extracting the statistical results, the researcher used the SPSS statistical bag to extract the values of the arithmetic mean, standard deviation, and t-value for one sample with a pre- and post-test.

Results and Discussion

Presentation of the results of the (T.test) test between the pre and post-test for the performance of the balance beam skills (under study) and for the experimental, control groups, and their analysis: The researchers used the (T) test for corresponding samples, to find out the significant differences between the pre and post-test for the two research groups in the skill of the balance beam, as shown in table 2 (Table 2).

Through the results in table 2, which include the arithmetic mean and standard deviations of the two experimental and control groups, as well as the values of (t.test) at the level of significance (0.05) and a degree of freedom (18) between the pre and post-tests, it is clear that the statistical evidence is with a value of (0.010).) which is less than the level of significance (0.05), and this indicates that there are significant differences between the pre- and post-test of the experimental and control groups, and this means that there is an improvement in the result of the post-test, as compared to the result of the pre-test in the skill of the balance beam (under study).

Presenting the results of the (T.test) test between the experimental and control groups in the post-test, to perform the balance beam skill (under study), and analyze: For the purpose of comparison between the results of the post-test for the experimental and control groups, and to find out, which is better, the (T. test) was used for asymmetric samples, to find out the significant differences between them as shown in table 3 (Table 3):

The results presented in table 3 show that the statistical evidence is at a value of (0.000), which is less than the level of significance (0.05). This indicates that there are significant differences between the experimental and control groups in the post-test, in favor of the experimental group, in the performance of the balance beam skill (under study).

Discussing the Test Results

It is clear to us through the results shown in tables 2 and 3, that there are significant differences between the pre and post-tests of the experimental and control research groups, in favor of the post-test of the experimental group. The two researchers attribute the reason for this difference, and the progress in performance, to the effectiveness of the device designed by the two researchers, which contained a detailed explanation of all the details of the skills, with the regular and slow presentation, as the correct explanation of the skill and its presentation in the slow manner enabled the students to know the subtleties and details of the skill, and this is what Thompson confirms it: "Slow motion can help focus on movements that are difficult to follow at normal speed." (Muhammad and Saadoun. 2017).In addition to containing the educational curriculum on the fine details of the skill using animated pictures and still images, as well as the explanation that gave the students a comprehensive idea of the learned skills, which led to learning them better than the control group. In addition, photographing the skills from multiple angles gave the students an opportunity to view the skills in all its parts and in several directions, and all of this made the skills fixed in kinetic memory and

long-term memory, as digital photography "It helps in integrating the senses of the learner, which makes the learning process easier, easier, and more attractive and exciting, as a result of the association of sound and image in the shown movie."(Abdel Khaleq. 2005).

The superiority of the experimental group over the control group in learning skills is due to the use of auxiliary teaching aids, which are (hyper media) which had a positive and effective impact on the learning process. "The reliance of any educational system on teaching aids is no longer a luxury, but has become a necessity to ensure the success of those systems, and an integral part of the structure of their systems" (8-28). Increasing the training modules in the college curriculum for more than one training module per week is a better result.. (linha,2017). Learning movement skills and education technology is increasingly affecting skills of a complex nature.(alham ali,shaimaa mater ,2021).

The use of ultra-interlacing media, which was applied to the experimental group, increased the learning opportunities for this group, by changing the role of the teacher and the student, through the application of the systemic approach to educational techniques, and this is what, as: "The student has become the focus of the educational process, and the role of the teacher is no longer limited to imparting information and indoctrination, and the educational process has become a partnership between the student and the teacher." (Abdel Khaleq. 2005).The researchers attribute this development to: It is an objective result of the multimedia design content, which had a balance between simplicity and difficulty, and this is consistent with what was reported "Very simple content and very complex information do not facilitate the learning process." (Abdel Khaleq. 2005). In addition, there is a major issue in the use of multimedia technology, which is to avoid repeating the problem that has persisted for a long time in the history of education, namely, the focus of attention in providing information rather than focusing on understanding, and that one of the means to help in understanding the student is the design of multimedia applications that reflect the natural characteristics of human learning. (Nuri, and Majeed. 2016). Through the results, we notice that the control group has achieved significant differences in the test results, but in lower percentages compared to the experimental group, which indicates that the educational curriculum developed by the college, and the method and method used by the school, fulfills its purpose, but with a higher percentage less.

Finally, the researchers see through all of the foregoing, that the most important reasons on which the success of the educational process depends is the use of the most appropriate educational means, which are commensurate with the learners' level and abilities, while ensuring the participation of all the senses of the learner, because the senses are the main window for communication with the outside world, And through it, the stimulus is transmitted to the brain, and the optimal method and method for learning is chosen. Thus, the researchers achieved the research objectives and hypotheses.

Conclusions

- The effectiveness of special exercises associated with the multi-purpose designed device and its positive impact on the development of coordinating abilities of the experimental group
- The results showed that there were statistically significant differences between the pre and post-tests and in favor of the post-test in the harmonic abilities of the experimental group under study.

Recommendations

- Applying special exercises according to the device designed for students and for different stages
- Need for workers in the field of teaching rhythmic gymnastics to pay attention to the use of devices that help increase kinetic mastery of rhythmic gymnastics skills.
- Need to use this multi-purpose device designed by the Iraqi Federation of Gymnastics
- Using these exercises on other age groups and using them with the training samples of the Iraqi Central Gymnastics Federation and the national teams

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Appendix 1: Shows the some exercises used on the multi-purpose machine.

Some exercises used on the multi-purpose

Disagree	Agree	Exercises	Figures
		Balance exercises	
		Walk on the crossbar	
		Walking on the instep on the crossbar	
		Walking heel on the crossbar	
		Walking on the crossbar with the feet touching the floor alternately	 
		Walking on the crossbar with the instep alternately touching floor alternately