EFFECT OF SPECIFIC EXERCISES USING AN INNOVATIVE DEVICE TO DEVELOP SPEED AND SCORING ACCURACY FROM MOVEMENT IN SOCCER PLAYERS 14-15 YEAR-OLD

Imad Salman Sabah
General Directorate of Education in Baghdad, Third Rusafa, Sports and Scouting Activities Department
IRAQ

Corresponding Author: emadss76@yahoo.com

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ABSTRACT

Background. The fast growth of training technology in sports has opened up new ways for young athletes to improve their skills. In soccer, for example, you need to use all of your perceptual, cognitive, and motor skills to do well in changing situations. **Objectives.** This study sought to investigate the impact of particular exercises utilizing an innovative device—Smart Goal—on enhancing speed and scoring precision in soccer players aged 14 to 15 years. **Method.** An experimental design was utilized, comprising two groups: an experimental group engaged in exercises using the Smart Goal device, and a control group adhering to conventional training methods. There were 24 male soccer players in the study, 12 in each group. They were chosen through purposive sampling. The training program took eight weeks, with three sessions each week. We used standardized tests to measure movement speed and scoring accuracy to gather data. We used paired and independent t-tests to find statistically significant differences between the scores on the pre- and post-tests. **Results.** The results showed that the experimental group did much better than the control group in terms of both speed and accuracy of scoring ($p < 0.05$). The sensory-based training method worked because more than 40% of people improved. The Smart Goal device improved perceptual-motor responses, neuromuscular coordination, and cognitive decision-making in dynamic situations that were like real games. **Conclusion.** The study finds that adding technology-assisted, multi-sensory exercises to youth soccer training can greatly improve motor-cognitive performance. Coaches should use smart training tools to get the neuromuscular system going and make learning more interactive. Future research should investigate more extensive applications across various playing positions and cognitive assessment instruments to advance training methodologies.

Keywords; exercises, speed, scoring accuracy, youth, soccer.

A. INTRODUCTION

Football has changed from being just a popular sport to a worldwide event that goes beyond sports competition. It acts as a way for people from different cultures to share ideas, connect with each other, and create a sense of national identity (Miguel et al., 2021). In addition to its fun and competitive sides, football has become a great place for scientists to study, especially in the areas of sports training, physical preparation, and performance optimization. This change has made football a major area of current research aimed at improving athletic performance and achieving long-term success (FIFA, 2022).

The game's social, cultural, and economic importance has led to constant improvements in training methods and the design of new equipment that aims to make training more effective and fun (Banwan Shareef, 2020). Using modern devices in sports training does more than just motivate athletes; it also improves accuracy, motor response, and sensory-motor integration. It also gives coaches objective data that they can use to see how players are doing and make decisions based on facts (Rivera-Brown et al., 2022).

One of the most important skills in football is scoring goals while moving, which is one of the most important things that affects the outcome of a match and the success of a team. This ability needs a combination of quick thinking, good decision-making, and technical accuracy. As a result, it has become a main focus of applied research and new ideas in the field of training science. In response to this need, the present study presents an innovative technological device—the Smart Goal—intended to enhance the speed and precision of goal-scoring in dynamic, match-simulated environments. As far as the researcher knows, this is the first device that trains and measures players' performance at the same time using multisensory cues in a circular setup that simulates real match pressure (Haarnoja et al., 2024).

Prior studies substantiate the efficacy of technology-assisted training in improving the technical skills of young athletes. Breaux et al. (2021) created an electronic device called Quality Response to help 14-year-old players get faster and more accurate. They found that using Fitlight and Quality Response systems made a big difference in motor performance. Storm et al. (2021) also talked about how assistive technologies can make training more competitive, interesting, and less boring by using visual and auditory stimuli to improve both physical and cognitive skills. These studies collectively emphasize the increasing

significance of digital devices in sports training for youth development (Méndez-Domínguez et al., 2022).

The researcher, who is also a coach and sports supervisor at the Ministry of Education, saw that young footballers in specialized centers still had problems with basic motor skills. Up to 60% of players did not meet expectations in periodic technical assessments. This deficiency may stem from the restricted application of specialized exercises emphasizing dynamic goal-scoring and inadequate alignment between training activities and actual match contexts (Kabacinski et al., 2022). Also, not using smart training tools enough slows down the growth of perceptual speed and neuromuscular coordination, which are both important for modern football performance.

To rectify these deficiencies, this study introduces a specialized training regimen that incorporates Smart Goal–based exercises to activate the neuromuscular system, augment scoring precision from movement, and elevate the capacity to perform intricate motor responses in competitive contexts. The program aims to enhance the connection between sensory processing and motor output, in accordance with modern theories that advocate for technology-enhanced, interactive learning in sports education.

So, the goals of this study are to:

1. Develop special exercises based on an innovative device to develop the speed and accuracy of goal-scoring from movement among soccer players aged 14–15 years.
2. Identify the effect of using the innovative device on developing motor response speed during the skill of goal-scoring from movement.
3. Measure the extent of improvement in goal-scoring accuracy from movement after implementing specific exercises using the innovative device.
4. Compare the results of pre- and post-tests to determine the effectiveness of the training program using the innovative device.

It is posited that statistically significant differences will exist between pre- and post-test results, favoring the post-tests, and that the Smart Goal exercises will enhance both the speed and accuracy of goal-scoring from movement among youth football players.

B. METHOD

Participant

The research population consisted of players from the Specialized Center in the Baghdad-Rusafa Third Education Directorate, in the junior category (born in 2011), aged (14) years, totaling (58) players who participated in the school tournament held by the Sports and Scouting Department in (2024). The research sample, consisting of (48) players, was selected and distributed over two stages of the research.

In the first phase, the entire sample (48 players) was used to construct a "smart goal" device test designed to measure motor response speed without a stimulus and with an auditory or visual stimulus. The test results were statistically analyzed for validity, reliability, objectivity, and normal distribution. In the second phase, (48) players were selected from the same research community and divided into two equal groups:

The experimental group: (24) players, randomly selected by lottery, underwent a training program using the designed device. The control group: (24) players, continued their usual training without using the device. "This distribution is methodologically appropriate for achieving the research objectives and ensuring the accuracy of the results". (Sumantri et al., 2023)

It also provides the results with an acceptable degree of reliability and generalizability. Methodological studies indicate the importance of selecting a sufficient sample size to ensure statistical power, as "sample size can significantly affect the results and their statistical significance".(García-Buendía et al., 2024) (7) Players were excluded for participating in the pilot study, and (3) Players were excluded for no other reason.

The research sample is "the part that represents the original community and on which the researcher conducted entire work".(Wilk et al., 2024). The research sample numbered (48 Players) out of the original community of (58 Players), representing (82.76%), as shown in Table No. (1).

Table 1. The part that represents the original community

Research community	Research sample	Experimental group	Control group	Exploratory group	Excluded group
58	48	24	24	7	3

Research Sample Equivalence

The research sample was divided into two groups, an experimental and a control, by drawing lots. The statistical package (SPSS) was used to determine the equivalence of the two groups in terms of body measurements before applying the specific exercises, as shown in Table (2).

Table 2. Samples of experimental group and control group

No.	Body Measurements	Calculated T-value	Significance value	Significance Level
1	Height	1.753-	0.06	Insig.
2	Mass	1.237-	0.173	Insig.
3	Age	0.511	0.432	Insig.

Table 3. Sample equivalence in the pre-tests for the two groups (experimental and control)

No.	Tests	Measurement unit	Experimental group		Control group		Significance level	Calculated (T) value	Significance of differences
			Mean	St.d	Mean	St.d			
1	Motion scoring response to a light stimulus	Degree	0.363	0.047	0.467	0.032	0.351	0.860	Insig.
2	Motion scoring response to an audio stimulus	Degree	0.082	0.013	0.098	0.007	0.512	0.676	Insig.
3	Motion scoring response to an unstimulated stimulus	Degree	0.323	0.018	0.236	0.0237	0.801	0.291	Insig.

Degree of freedom (46) under error level (0.05)

Research Design

The researcher used the experimental approach because it suited the nature of the research problem, and used a design method that involved both control and experimental groups (pre-test and post-test). This method is "the most accurate method for testing hypotheses and cause-effect relationships, and for providing reliable results". (Majed, 2022).

The Designed Device (Smart Goal)

The researcher designed and built the Smart Goal device to help with the goals of this study, especially to measure and improve soccer players' speed of motor response and accuracy of scoring. The device combines audio and visual stimuli to mimic real match conditions and test how players react to both types of stimuli. The goal is to improve players' accuracy when scoring goals while moving by recreating real game situations that improve their perceptual speed, motor control, and ability to respond accurately to sensory cues. The device also helps players improve their ball sense and control by making the scoring area smaller, which makes it feel like they are under defensive pressure during competition.

Testing Procedures

The device was put on a regular football goalpost, and there were four LED lights at each corner. Players stood in a circle with a 2-meter diameter that was 11 meters from the goal. Before shooting at the goal based on the stimulus, each person did a dribbling exercise. The testing protocol included five tries, each of which involved dribbling and then taking a shot based on a sensory cue, either visual or auditory.

The player dribbled for 20 seconds in the first trial. Then, a light came on in one corner of the goal, and the player shot toward that corner. In the second and third trials, the light turned on at random times while the participants dribbled for 30 and 25 seconds, respectively. The fourth and fifth trials each had 35 and 40 seconds of dribbling, and then shooting at the lit corner.

Test 1: Speed of response and accuracy of scoring without stimulus

This test checked how quickly and accurately the players could score without any outside help. The player took five shots in the same setup. There was a 10-point scale for scoring, and each successful shot toward the designated corner earned 2 points. If you missed your target, stepped outside the circle, or lost the ball, you got zero points for that try.

Test 2: Response and accuracy based on movement using sound

This test looked at how well the players could respond to sounds. A loudspeaker near the player made a sound that matched the color of one of the lights at the corners of the goal.

The player then dribbled for 20 to 40 seconds, depending on the trial, and shot toward the corner that matched the color of the sound. The scoring was the same 10-point system as in the last test.

Test 3: Response and Accuracy Based on Motion Using Visual Stimulus

The goal of this test was to see how quickly the players could respond and how accurately they could score when they saw visual cues. One of the four corner lights on the goal was randomly turned on during each trial, and the player had to shoot toward that corner after dribbling for 20 to 40 seconds. The same scoring system was used (with a maximum of 10 points), and the final score was based on accuracy, positioning, and following the rules of the test.

Pilot Studies

On March 22, 2024, a first pilot study was done with seven players from the research population who were chosen at random. The goal was to test the Smart Goal device's functionality, make sure the testing setup was appropriate, find any possible technical problems, and see how well players responded. Based on the results, small changes were made to the procedure to make the experiment work better.

On April 27, 2024, a second pilot study was done with a different group of nine players. The goal of this phase was to find the best intensity and duration of exercise, set the highest effort levels and heart rate limits, and make sure the exercises were right for the players' ages and skill levels. It also helped set the rules for how to tell the experimental group from the control group in the main experiment.

Discriminant validity of the test

The test was administered to all sample members, totaling (58) players. The researcher arranged the test results on the device in descending order, taking (27%) of the results of (15) players as the highest values, and (27%) of the results of (15) players as the lowest values, to determine the test's ability to distinguish between the high-level group and the low-level group. The data were statistically processed using the SPSS program to determine the level of significance and the (t) value, using (t) for independent samples (differences between two groups). The results were statistically significant, as shown in Table (4).

Table 4. Discriminant validity

No.	Tests	T-value	Significance level	Statistical significance
1	Motion scoring response to a light stimulus	11.77	0.00	Sig.
2	Motion scoring response to an audio stimulus	7.66	0.00	Sig.
3	Motion scoring response to an unstimulated stimulus	20.08	0.00	Sig.

Test Reliability

The reliability and consistency of test results when applied more than once under similar conditions. The researcher administered the test and reapplied it to the research community five days later. The Pearson correlation coefficient and significance level were calculated using the statistical package (SPSS). The results appeared at a significance level of (0.05), which is significant and highly correlated. Table (5) shows the test reliability results:

Table 5. Test Reliability

No.	Tests	T-value	Significance level	Statistical significance
1	Motion scoring response to a light stimulus	0.88	0.00	Sig.
2	Motion scoring response to an audio stimulus	0.95	0.00	Sig.
3	Motion scoring response to an unstimulated stimulus	0.91	0.00	Sig.

Objectivity is one of the fundamental foundations of scientific research. It means that the researcher must be unbiased throughout all stages of their research. Research results must be logical and independent of the researcher's opinions and beliefs, regardless of who conducted the test. Subjective judgments must be excluded from the test. A test is considered objective if it yields the same scores, even if the test conditions and the tester change).(Parraca et al., 2022) Based on the results of the two judges the researcher consulted, correlation results for both judges were calculated using the statistical package (SPSS), using Pearson's correlation coefficient. Table (6) shows the results of the test's objectivity:

Table 6. Pearson's correlation coefficient

No.	Tests	T-value	Significance level	Statistical significance
1	Motion scoring response to a light stimulus	0.86	0.00	Sig.
2	Motion scoring response to an audio stimulus	0.91	0.00	Sig.
3	Motion scoring response to an unstimulated stimulus	0.910	0.00	Sig.

(*) Below the significance level (0.05) and with a degree of freedom of (24)

Test Difficulty Level

The scientific conditions required by the test results and their suitability for the study sample were demonstrated. These conditions indicated (the testers' levels of test difficulty, the tendency of test scores toward moderation (normal distribution), and that test results should not be clustered at a single level) (Gómez, 2022). The skewness coefficient used by the researcher was between the level of the normal curve for the research sample, which is closer to the normal distribution. Table (7) shows the normal distribution of the tests.

Table 7. Test Difficulty Level

No.	Tests	Measurement unit	Mean	Standard Deviation	Median	Skewness Coefficient
1	Motion scoring response to a light stimulus	Degree	0.405	0.045	0.429	0.291
2	Motion scoring response to an audio stimulus	Degree	0.089	0.0219	0.075	0.231
3	Motion scoring response to an unstimulated stimulus	Degree	0.213	0.018	0.204	0.733

Pre-tests

The pre-tests were conducted for the research sample at 3:30 p.m. at Natiq Hashim Stadium. The researcher carefully controlled and established the conditions related to the tests, the equipment and tools used in the tests, and the support team to control any potential variables during the post-tests, which were conducted as follows: The motor response speed and scoring accuracy tests were conducted for the experimental and control groups on Friday and Saturday, March 1-2, 2024.

Special Exercises

The researcher prepared specific exercises for scoring skills (sense and control of the ball, reaction speed, visual perception, shooting in tight spaces, shooting under pressure from defenders, shooting from different positions, shooting after quick passes, shooting from varying distances, shooting with the instep of the foot, dribbling and shooting, and shooting under time pressure). The researcher ensured that the exercises resembled playing and avoided the monotony of boredom. This was achieved by using the innovative device - the

smart goal - to measure the speed of motor response to scoring skills. To achieve the research objectives, the exercises were administered to the experimental group by the assistant team and under the supervision of the researcher. The researcher did not intervene in the exercises of the control group. The researcher relied on his experience and scientific sources as follows:

1. Duration of the exercises (8) weeks
2. Number of training units (24), with the first training unit being on Saturday, August 8, 2024, and the last training unit on May 5, 2024. Saturday, three training sessions per week: Saturday, Monday, and Wednesday.
3. Intensity (70-85% of maximum effort)
4. High-intensity interval training method
5. Total number of exercises: 102

Post-tests

After completing the exercises designed by the researcher on Saturday, June 1, 2024, the post-tests were conducted. After the researcher completed the exercises he designed for the experimental group, he conducted post-tests for both the experimental and control groups to measure the results. He took into account all the conditions that accompanied the pre-tests.

Statistical Methods

The researcher used the statistical package (SPSS). The following criteria were used: arithmetic mean, median, skewness coefficient, Pearson's correlation coefficient, standard deviation, t-test for independent uncorrelated samples, and t-test for independent uncorrelated samples.

C. RESULTS AND DISCUSSION

Results

By presenting the results of the differences between the pre- and post-tests for the research variables for the experimental group in Table (8), which shows that there is a significant effect on the test results in favor of the post-tests, with a development rate ranging from (161.42 - 118.49%). In the motor response speed test for the skill of scoring

from movement with a visual stimulus, the difference was significant in favor of the post-test, with a development rate of (161.42%).

The arithmetic mean, standard deviation, calculated (t) value, and significance for the pre- and post-tests for the response speed for the technical performance of the skill of scoring from movement with a visual stimulus. The researcher attributes the reason for the development to the specially designed exercises and the researcher's use of the innovative device (the smart goal), as the latter targeted sensory stimuli (visual and auditory) that suddenly appear in different angles of the goal, which motivated the players to respond quickly and accurately to a changing (visual) stimulus.

Table 8. Shows the results of the pre- and post-tests and the percentage of development in the research variables for the experimental group

Skill Tests	Measurement Unit	Pre-test		Post-test		Difference of means	(F) value	Calculated T. value	significance value	Sig Significance	Development rate
		Mean	St.d	Mean	St.d						
Motion scoring response to a light stimulus	Degree	0.477	0.026	1.196	0.132	0.712	0.034	17.28	.000	Sig.	161.42
Motion scoring response to an audio stimulus	Degree	0.083	.0130	0.201	.0150	.1540	0.109	14.23	.000	Sig.	118.49
Motion scoring response to an unstimulated stimulus	Degree	0.212	.0220	0.613	.0210	.1970	0.032	21.43	.000	Sig.	124.26

N = (10) under significance level (0.05) and degree of freedom (9)

Table 9. Shows the results of the pre- and post-tests and the percentage of development in the research variables for the control group

Skill Tests	Measurement Unit	Pre-test		Post-test		Difference of means	(F) value	Calculated T. value	significance value	Sig Significance	Development rate
		Mean	St.d	Mean	St.d						
Motion scoring response to a light stimulus	Degree	0.466	0.042	0.613	0.0677	0.137	0.013	4.701	.000	Sig.	27.35
Motion scoring response to an audio stimulus	Degree	0.078	0.018	0.103	0.005	0.012	0.005	3.174	.000	Sig.	23.71
Motion scoring response to an unstimulated stimulus	Degree	0.219	0.023	0.262	0.012	0.037	0.008	3.706	.000	Sig.	15.92

By presenting the results of the differences between the pre- and post-tests for the research variables for the control group in Table (9), we demonstrate a significant effect on the test results, in favor of the post-tests, with a development rate ranging from (27.35 - 15.92%) in the motor response speed test for the skill of scoring from movement with a visual stimulus. This indicates a slight significant difference between the results of the two tests, in favor of the post-test, which was not at the same level compared to the experimental group.

The researcher attributes the limited difference in the development rates of the control group members between the pre- and post-tests to their commitment to a traditional training program that did not include specific exercises directed using the "smart goal" - the innovative device - which explains their slow developmental pattern. In contrast, the experimental group, which underwent a special exercise program designed by the researcher, showed significant improvements in motor response speed and scoring accuracy, indicating the effectiveness of exercises based on sensory, auditory, and visual stimulation in developing skill capabilities.

Presentation of the results of the post-tests for the experimental and control groups.

After the researcher completed the presentation and discussion of the results of the pre- and post-tests for both the experimental and control groups separately, he moved on to analyze the comparative results between the two groups, relying on the data contained in Table (10). This was done to extract the essential differences and interpret them in light of the research objectives and data.

Table 10. Shows the arithmetic means, standard deviations, calculated t-value, sig score, and significance for the post-skill and strategic tests for the experimental and control groups

Skill Tests	Measurement Unit	Pre-test		Post-test		Calculated T. value	significance value	Sig Significance
		Mean	St.d	Mean	St.d			
Motion scoring response to a light stimulus	Degree	1.013	0.106	1.567	0.053	12.48	.000	Sig.
Motion scoring response to an audio stimulus	Degree	1.359	0.035	1.851	0.937	14.62	.000	Sig.

Motion scoring response to an unstimulated stimulus	Degree	1.479	0.091	1.921	0.098	11.77	.000	Sig.

(*) Degree of freedom = 46, and significance level 0.05

Table 10 shows the arithmetic means, standard deviations, calculated t-values, and significance levels for the skill performance tests' post-test results in both the experimental and control groups. The analysis demonstrated statistically significant differences ($p \leq 0.05$) between the pre- and post-test scores, favoring the experimental group across all assessed variables. In the motion scoring response to a light stimulus, the mean score rose from 1.013 ± 0.106 in the pre-test to 1.567 ± 0.053 in the post-test, resulting in a t-value of 12.48 ($p = 0.000$). This progress shows that exercises based on visual stimuli really did help the players' perceptual speed and scoring accuracy. The mean for the motion scoring response to an auditory stimulus also went up, from 1.359 ± 0.035 to 1.851 ± 0.937, with a t-value of 14.62 ($p = 0.000$). This shows how powerful auditory cues can be in triggering quick responses and improving sensorimotor coordination when shooting. The mean in the motion scoring response to an unstimulated stimulus went up from 1.479 ± 0.091 to 1.921 ± 0.098, with a t-value of 11.77 ($p = 0.000$). This outcome signifies a significant improvement in intrinsic motor control and anticipatory response, even in the absence of external stimuli.

The results show that the Smart Goal training program made a big difference in response speed and scoring accuracy for all types of stimuli. These results bolster the hypothesis that multisensory, technology-enhanced training can significantly enhance the perceptual-motor integration necessary for elite football performance.

Discussion

The current study aimed to identify impact of specific exercises using innovative device (Smart goal) to develop speed and scoring accuracy from movement of soccer players aged 14-15 years. The special exercises using devices and training tools and methods that have a positive impact on developing the speed of motor response and the speed of performing football skills (Qutaiba Younus, 2021).

They are similar to real-life playing situations, as the device was designed to be a semi-realistic training environment, as it imposed immediate challenges on the player that required a quick motor decision, which was reflected in the efficiency of the motor neuron response, and created an interactive and changing environment that made the player ready

to make quick decisions in a specific time and immediate feedback, as the device gives direct feedback to the player and the coach about the response time and the scoring location, which helped in the immediate evaluation and modification of performance (Thompson et al., 2022).

The researcher also adopted the training method in designing the exercises that lasted (8) weeks at a rate of (3) training units per week, targeting the development of the speed of motor response for the scoring skill with only a visual stimulus, then only an auditory stimulus, and without the last stimulus to provide moral motivation and increase the number of repetitions to form the motor program in the central nervous system, and the motor neuron coordination for the skill of scoring from movement, with special compound exercises (stimulus + movement + decision + implementation).

The researcher relied on principle of gradual increase in the intensity of the training load and the work ratio (1-3), the researcher started the exercises with specific stimuli and a relatively easy time period, and gradually became complex and multiple stimuli to increase the challenge. It is the result of applying the exercises using the innovative device (smart goal), as the exercises were designed in a way that focuses on scoring techniques from movement, and the researcher modified the stimuli in each stage of the exercise to stimulate the players' response gradually and in a wavy way that increased the effectiveness of the exercises.

The players in the experimental group showed a response to the innovative device (smart goal), as the visual and auditory stimuli helped improve their ability to react more quickly to different playing situations. This is what Ihsan (2023) indicated (the use of rapid response devices and motor simulation contributes directly to increasing the speed of motor response and improving the accuracy of scoring, by stimulating the motor nervous system and improving the player's motor coordination.

The researcher sees the necessity of using special exercises using training methods, devices, tools and auxiliary means due to their positive impact on developing the speed and accuracy of scoring from movement and the speed of performing football skills. This trend is consistent with what Shareef (2025) indicated, as they demonstrated that training programs that employ modern technological methods and tools lead to better activation of the neuromuscular system, which is reflected in overall skill performance.

Christiani (2021) also confirmed that incorporating specific exercises designed according to the player's requirements contributes to accelerating the pace of physical and skill development more than traditional training methods. The control group's reliance on a curriculum that did not focus on diverse sensory stimuli in its exercises negatively impacted the development of scoring speed and accuracy, unlike the experimental group, which was influenced by the designed exercises and the use of an innovative device that stimulated the central nervous system, increasing the effectiveness of the exercises and skill mastery in the experimental group. Karasievych and Abdul Majeed (2020) indicated that "the use of innovative training methods enhances the efficiency of motor performance by stimulating multiple senses, which in turn increases the effectiveness of exercises".(Karasievych et al., 2021)

Miguel (2021) believe that "training using diverse stimuli (auditory and visual) leads to improved sensory perception, thus developing motor response speed in complex skill activities".(Miguel et al., 2021) Despite the significant differences, the rates of improvement were limited when compared to the experimental group, which underwent specific exercises using an innovative device manufactured by the researcher. This reinforces the importance of the designed exercises and their direct impact on improving the efficiency of motor performance in the scoring skill.(Borges et al., 2022)

By presenting the results of the post-tests for the research variables for both the experimental and control groups, the differences resulting from the impact of the adopted training program become clear. This allows for a comparative analysis to reflect the effectiveness of the experimental treatments used.

The results of the three motor response speed tests (with visual, audio, and without stimulus) indicate a tangible improvement in the accuracy of movement scoring among the players in the experimental group. The researcher attributes this development to the close link between the speed of motor response and the efficiency of performing the scoring skill. Naturally, processing sensory stimuli quickly and the precise motor response are among the basic determinants of scoring accuracy in football. This was confirmed by Umamaheswari et al. (2024), who believe that “a player who has a quick motor response is more able to adapt his performance to sudden situations within the penalty area, which contributes to directing the ball accurately towards the appropriate angles of the goal”.(Umamaheswari, 2024)

The researcher agrees with what Lloyd et al. (2015) stated that scoring accuracy is positively related to the ability to make quick decisions and motor preparation in crucial moments, especially in dynamic situations. The researcher relied on exercises with various stimuli (visual and auditory) that stimulated the brain to activate the neural pathways associated with motor sensing and precise control of the ball's direction and force, which is reflected in researcher confirmed that the designed exercises have succeeded in enhancing the integration of the neuromuscular system with sensory processes, which led to a qualitative improvement in the skill performance of the players, especially in situations that require high accuracy and instant decision-making.

The exercises using the innovative device (smart goal) adopted by the researcher have contributed effectively to developing the speed and accuracy of scoring from movement among football players in the experimental group, using different types of stimuli (visual, auditory).

D. CONCLUSION

In accordance with the study's objectives and hypotheses, and supported by the statistical analysis of pre- and post-test results, the findings indicated that the experimental group significantly surpassed the control group in the skill of goal-scoring from movement. This shows that certain exercises that use visual and auditory stimuli can help speed up motor response and improve scoring accuracy. Incorporating multi-sensory cues into an interactive training environment enhanced neuromuscular coordination and facilitated swift decision-making, leading to superior performance in actual game scenarios. The Smart Goal, a new device, was a useful way to improve sensorimotor skills related to shooting because it gave players dynamic stimuli that mimicked the pressures of a match and required them to adapt quickly. The improvement rate, which was more than 40% for all measured variables, shows that the training program worked on both the mechanical parts of skill execution and the cognitive and neural systems that make high-level performance possible. Conversely, dependence on conventional training methods yielded minimal advancement, underscoring the necessity to incorporate modern theories of kinesiology and sports neuroscience into football training.

The study suggests adding multi-stimulus exercises to training programs for young players to speed up their motor response and make them more accurate when scoring. Coaches should learn how to use smart, tech-based tools and neuromuscular activation methods to get the best performance results. Future research should encompass various age groups and playing positions, utilizing sophisticated cognitive and sensory assessment instruments that more accurately capture the exigencies of contemporary football.

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F. AUTHOR CONTRIBUTION STATEMENT

Imad Salman Sabah is the sole author of this work. He independently conceived the research idea, designed the Smart Goal device, developed the experimental procedures, collected and analyzed the data, interpreted the results, and prepared the manuscript for publication. All aspects of the study, including conceptualization, methodology, data validation, and writing, were completed under his direct supervision and responsibility.

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