



## **The effectiveness of an educational model based on video self-observation and guided feedback in learning and retaining basic skills among young gymnasts**

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### **Abstract**

This study aimed to investigate the effectiveness of an integrated instructional model based on visual modeling, video-based self-observation, guided feedback, and an externally focused attention framework on learning and retaining fundamental gymnastics skills among young gymnasts compared with the traditional teaching method. A quasi-experimental design with two groups (experimental and control) was employed. The sample consisted of 40 young gymnasts aged 8–10 years from a sports academy in Riyadh, randomly assigned into two equivalent groups (20 participants each).

The instructional program was implemented over eight weeks, with two training sessions per week, each lasting 90 minutes, according to a protocol that included warm-up, video demonstration, part-to-whole guided practical training, self-observation through video analysis, followed by re-application and applied play. Performance was evaluated in five fundamental skills (forward roll, backward roll, handstand, front balance, and cartwheel) using a validated skill performance rating form. Measurements were conducted at three stages: pre-test, post-test, and a retention test four weeks later. Data were analyzed using t-tests, repeated-measures ANOVA, and effect size indicators (Cohen's d, partial  $\eta^2$ ).

The results revealed equivalence between the two groups at the pre-test stage, followed by statistically significant superiority of the experimental group in both the post-test and retention

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test, with very large effect sizes. The experimental group showed big improvement between the pre- and post-tests and maintained nearly the same performance level in the retention test, whereas the control group exhibited only limited improvement and partial skill loss.

The study concludes that the integrated instructional model based on video self-observation and guided feedback is more effective than the traditional method in accelerating the acquisition of fundamental gymnastics skills, improving performance quality, and enhancing short-term learning retention among young gymnasts. Accordingly, the study recommends adopting this model in gymnastics teaching programs and sport science curricula.

**Keywords:** Learning, feedback, young gymnasts.

## Introduction:

Gymnastics is one of the most important individual sports that requires a unique integration between physical abilities, fine motor skills, body awareness, and mental discipline, where coordination between strength, flexibility, balance, and neuromuscular control (Schmidt & Lee, 2019). The basic skills in gymnastics are highly specific in terms of their complex motor structure, precision of execution, and the need for gradual learning based on the principles of motor learning and neuromuscular adaptation. This makes it an important field of research, which is reflected in the development of teachers' and coaches' skills in gymnastics and is evident in effective teaching methods and constructive feedback in different learning environments. Studies have shown that traditional teaching methods based on repetition and direct demonstration may not be sufficient to impart the required motor skills in gymnastics, especially given the variation in motor abilities among students (Sadowski et al., 2013). These methods do not use an interactive learning environment that helps the learner to observe themselves and analyze their performance, and interact with the movement model according to their individual characteristics. so, it become necessary to find more comprehensive and flexible modern educational models that care about learner's characteristics and encourage their active participation in the learning process. designing educational models (Instructional Design Models) are the most important trends in developing sports education and training. These models help mix up of motor learning principles with modern educational technology, to guaranty the transfer of knowledge to real performance situations (Amri-Dardari et al., 2022). An educational model is not just a teaching plan, it is complete system including objectives, content, strategies, assessment, the learning environment, and feedback. Several models developed in this field, such as Gagnes' Events of Instruction model, Merrill's Principles of Instruction model, and Dick and Carey's model, all of it confirms the importance of a gradual learning process, from understanding to application, and from repetition to mastery. In sports science field, advanced educational models such as (Teaching Games for Understanding, Nonlinear Pedagogy, and Hybrid Models) represent a scientific way that seeks to merge cognitive,



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emotional, and motor aspects into the learning process (Harvey et al., 2020). The results of many studies shows that integrated models that rely on visual feedback, video analysis, external attention, and the use of three-dimensional motion simulation significantly improve the technical performance of young gymnasts (Sigrist et al., 2013; Wulf & Lewthwaite, 2016). According to these data, gymnastics education is not only a skill acquisition process, but it is a cognitive-perceptual-motor system that requires the activation of visual perception processes, movement mental representation, and motor control. So, designing an integrated educational model that takes into account the sequence of sensory stimuli, instant feedback, and the gradation of difficulty can make a qualitative shift in learning gymnastics basic skills such as: handstands, forward and backward rolls, jumping, balancing on the bar, and safe landing. Many studies also confirm that mixing digital technology into gymnastics education is a promising trend in modern motor learning, as e-learning environments and analytical video help the student to self-review, compare with the ideal model, and identify errors with high temporal and spatial accuracy (Farouk et al., 2021). Therefore, designing an interactive digital learning model based on video and instant feedback can improve the process of skill retention and transfer to new situations, which will positively impact the quality of motor education in sports science colleges. Recent studies have shown that the use of analytical video and visual feedback is clearly superior to traditional methods in improving motor performance accuracy and learner motivation (Bouzid et al., 2025). Interactive digital media also proven effective in increasing engagement and attention among young gymnasts (Petrusic et al., 2022). Self-observation studies confirmed that showing a learner's previous best performance helps to improved balance, accuracy, and skill retention (Ginsburgh et al., 2017; Ste-Marie et al., 2011, 2012). Studies have also shown that external attention is superior to internal attention in learning and maintaining balance skills (Chiviawosky & Wulf, 2015). Analytical reviews shown that visual feedback, especially slow-motion video, is most effective for complex skills like gymnastics (Sigrist et al., 2013). Studies also confirmed that a mixed feedback pattern (correction + reinforcement) is the most efficient for motor learning (Niznikowski et al., 2012) practical studies shows that using video modeling, showed a significant improvement in the quality of technical performance and skill retention (Boyer et al., 2009). Arab studies have also confirmed the effectiveness of active learning and practical application compared to direct instruction (Qutb et al., 2020). And the importance of scheduling training programs to improve learning outcomes (Mahmoud Bilal, 2015). According to these findings, the research utilizes these results to develop an integrated educational model based on video, self-observation, guided feedback, and external attention to improve the learning and retention of gymnastics skills. Many studies have explored educational use of modeling and multimedia feedback, that proof its effectiveness in developing students' acquisition of physical skills in sports science subjects (Musleh, 2020; Al-Zahrani, 2018; Al-Dossari, 2021). These studies indicate that modern models not only demonstrate the skill but



also involve the student in understanding its mechanical, kinematic, and physiological stages, which enhances the student's ability to analyze and self-modify performance. the study responds to the scientific need for a modern educational model for teaching basic gymnastics skills, that depend on the scientific principles of motor learning, cognitive information processing theories, and digital visual modeling, and aims to develop the performance of young gymnasts and achieve more stability learning. study also analyze the impact of this model on various learning variables, such as acquisition speed, performance quality, and skill retention, compared to traditional direct learning.

### **Research Problem:**

despite the variety of motor learning methods used in teaching gymnastics skills, slow skill acquisition and poor retention are still noticed in young athletes when using traditional methods based on verbal explanation and direct demonstration, especially with basic complex skills. Studies show that using visual video modeling, self-observation, and guided feedback can improve the quality of motor learning. but most studies take each element without linking it to objective measurements of short-term skill retention. The research gap is the lack of integrated educational models that combine self-observation video, perfect modeling, and externally focused guided feedback within experimental framework can measure the effect of such a model on learning and retaining basics gymnastics skills compared to the traditional method.

### **Research goals:**

1. identify the effect of the proposed educational model compared with traditional method on improving the performance level of basic gymnastics skills among the participants.
2. identify the effect of the model on the retention of basic skills after 4 weeks.
3. identify the effect of the educational model on learning and retaining basic gymnastics skills.

### **Research Hypotheses:**

1. There are statistically significant differences between the mean scores of the experimental and control groups in the post-test of basic gymnastics skills performance, favoring the experimental group.
2. There are statistically significant differences between the mean scores of the experimental and control groups in the retention test after 4 weeks from the end of the program, in terms of skill performance level for basic gymnastics skills, in favor of the experimental group.



3. There are statistically significant differences between the mean scores of the experimental group in the pre-test and post-test of basic gymnastics skills performance, in favor of the post-test.
4. There are differences in favor of the effect sizes of the educational model, which are large values, indicating a strong actual effect of the model on learning and retaining basic gymnastics skill.

**Procedure:**

- Research Methodology:

the experimental method with a two-group model: an experimental group receiving the integrated educational model, and a control group receiving the existing traditional education used in this study.

- Study Sample:

study sample consists of (40) young gymnasts, selected purposively from sports academies in Riyadh, aged (8-10) years, and randomly divided equally into two groups (20 young gymnasts in each group).

First, Equivalence between the two groups in physical characteristics:

To ensure the validity of the experimental results and the possibility of attributing next differences to the effect of the educational program used, pre-equality between the experimental and control groups was verified in both physical and physiological characteristics using the independent samples t-test. This was done on the sample of young gymnasts (8-10 years old), as shown in Table (1).

**Table1. (t) test results for pre-equivalence between the experimental and control groups in the physical and physiological variables of junior gymnasts (8–10 years old)**

variable	experimental (M ± SD)	control (M ± SD)	t	df	significance
Age (years)	9.10 ± 0.60	9.10 ± 0.50	0.00	36.80	unsignificant
Height (cm)	134.20 ± 6.10	133.70 ± 6.40	0.25	37.91	unsignificant
Mass (kg)	31.40 ± 4.20	31.10 ± 4.60	0.22	37.69	unsignificant
BMI (kg/m <sup>2</sup> )	17.40 ± 1.50	17.30 ± 1.60	0.20	37.84	unsignificant
Standing Broad Jump (cm)	146 ± 18	145 ± 19	0.17	37.89	unsignificant
Medicine Ball Throw (m)	3.60 ± 0.50	3.50 ± 0.60	0.57	36.80	unsignificant



Grip Strength (kg)	16.20 ± 3.10	15.90 ± 3.00	0.31	37.96	<b>unsignificant</b>
20m Sprint (s)	4.78 ± 0.29	4.81 ± 0.31	-0.32	37.83	<b>unsignificant</b>
4x10m Shuttle Run (s)	13.20 ± 0.60	13.30 ± 0.70	-0.49	37.13	<b>unsignificant</b>
Flexibility (Sit & Reach) (cm)	20.40 ± 5.10	19.80 ± 5.30	0.36	37.94	<b>unsignificant</b>
Plank Stability (s)	58 ± 18	56 ± 17	0.36	37.88	<b>unsignificant</b>

The results in Table (1) shows that all statistical significance (p) values for comparisons between the experimental and control groups in the anthropometric variables (age, height, mass, and BMI) and physical variables (explosive power, arm strength, grip strength, speed, agility, flexibility, and trunk strength) were not statistically significant ( $p > 0.05$ ), which means no significant differences between the two groups before using the program. the close convergence of means and standard deviations shows a high degree of homogeneity and pre-equivalence in the physical and anthropometric characteristics associated with the performance requirements of gymnastics for this age group. This result confirms the internal validity of the study, allowing any subsequent differences in post-measurements to be attributed to the educational program's effect rather than to initial differences between the two groups.

**Tools:**

First, performance evaluation form design:

A standardized skills evaluation form was designed for the basic gymnastics' skills (forward roll, backward roll, handstand, front balance, and sideways somersault) on a scale of (0–100) based on a documented judging framework and using international judging rules. The form was presented to accredited judges to verify its validity and reliability, and the results are shown in Table (2).

**Table2. statistical coefficients of the skill performance evaluation form in basic gymnastics skills (validity and reliability)**

skill	validity Index	referees' agreement percentage	internal consistency	Overall evaluation
forward roll	0.89	0.78	0.88	Acceptable – High stability
backward roll	0.91	0.82	0.86	Acceptable – High stability



handstand	0.93	0.85	0.91	Acceptable – High stability
front balance	0.88	0.76	0.87	Acceptable – High stability
sideways somersault	0.92	0.81	0.89	Acceptable – High stability
overall average	0.91	0.80	0.88	Excellent validity and reliability

The statistical analysis of the skill performance assessment form refers to high degree of validity and reliability. Content validity coefficients ranged from 0.88 to 0.93, values exceeding the scientifically acceptable threshold. The judges' agreement on the importance of the items also demonstrated a good level of judge acceptance. average of internal consistency ( $\alpha = 0.88$ ) in the excellent reliability range, reflecting the homogeneity of the items and their ability to measure a single skill structure accurately. form's suitability for using in the scientific and practical evaluation of basic gymnastics skills confidently confirmed by the results.

Second, scientific standards and principles for designing the educational program:

The educational program designed according to the principles of motor learning and theories of cognitive processing, and modern educational design models in sports science. The program depends on an integrated educational model that mixed visual modeling, video self-observation, guided feedback, and external attention as an important basics for effective motor learning. Using a short video showing for an ideal perfect performance model at the beginning for each unit to make a clear mental image of the skill. Applying self-observation after each training set to improve motor cognitive and self-correction. Feedback was provided at a standardized rate (20%) according to the Bandwidth Feedback model to reduce dependence on the instructor. The program relied on external attention to improve balance, force regulation, and reduce small errors. The gradual progression in learning skills was also considered, from segmentation to integration to automated performance. this perfect design helps to improve the quality of motor acquisition and increasing the level of long-term skill retention.

Third, educational program time line:

according to a time plan educational program organized within 8 weeks to account the gradual progression from learning basic skills individually to integrating them into complete movement sequences. the weekly unit included skill training for (almost 40 minutes), followed by a video show of the perfect ideal performance model, and visual analysis and self-observation via video, then reapplying and practicing. then set the proportions and patterns of feedback according to the (V/A/M/C) code, distributed among visual, auditory, modeling, and combined, and maintaining a standardized overall feedback percentage not mor than (20%) of the total



attempts. This gradual structure reflects the trainees' transition from reliance on direct external guidance in the initial weeks to increased reliance on self-observation and visual analysis in subsequent weeks, thus supporting independence in learning and consistency in skill performance.

(90-minute) training unit:

the educational unit take (90 minutes) divided in a way that balances the requirements of physical preparation, skill learning, and motor knowledge. (15) minutes for general and specific warm-ups, (10) minutes for showing the model video and explaining the main technical points, then a guided practical training time of (40) minutes according to the principle of Part → Whole with video recording, then (15) minutes for analyzing the video and self-observation in slow motion, then (5) minutes for reapplying after analysis to confirm corrections, and (5) minutes for applied play or skill challenge to transfer the skill to situations closer to reality.

Feedback documentation model:

To adjust and standardize the feedback according to motor learning principles, the researchers used a model to record the type of feedback provided (visual, verbal, dual, kinesthetic, or no feedback), the number of attempts that received feedback compared to the total number of attempts, and the timing of feedback delivery (during or after performance). A representative sample of sessions (6 out of 16) was analyzed to confirm adherence to the planned feedback rate (almost 20%). The actual rate ranged between 18% and 22%, reflecting good procedural discipline and allowing for attributing differences in results to the effect of the learning program.

Researcher's observations on commitment	Timing (during/after the performance)	Feedback type (V/A/M/C/N)	Percentage %	Number				
				of attempts with feedback	Number of attempts	of skill	Player code	Session number

Tools

- Specific skill tests to measure basic gymnastics skills (forward roll, backward roll, handstand, front balance, sideways somersault).
- Video Recording: A single camera to record the performance before and after, to review self-reports, and then to analyze the performance and review the technical execution.
- Coach's Observation Sheet for direct observation of trainees' performance during training, to record the number of repetitions, feedback intervals, and type of feedback, based on research protocols on feedback repeating.



• Use of forms and observations to record performance scores (Schmidt & Lee, 2019; Musleh, 2020).

Procedures:

1. Obtain parental/sports academy consent.
2. Conduct a standardized pre-test, record performance via video, and have it evaluated by two independent judges to calculate the consistency coefficient between judges.
3. Participant-randomly assign participants to two age- and skill-equivalent groups.
4. Performing the protocol for 8 weeks with the experimental group.
5. Administer a post-test to both groups after completion of the proposed program.
6. A retention test 4 weeks after the experimental group completes the proposed program.

Results:

**Table4. Results of the (t) test to measure pre-equivalence in the level of skill performance in gymnastics between the experimental and control groups**

Skills	experimental (M)	experimental (SD)	control (M)	control (SD)	t	SIG
forward roll	49.0	7.2	48.6	7.4	0.19	unsignificant
backward roll	50.3	7.0	49.8	7.2	0.24	unsignificant
handstand	48.8	7.5	49.1	7.3	0.12	unsignificant
front balance	49.5	7.1	48.9	7.3	0.26	unsignificant
sideways somersault	50.1	7.3	49.7	7.1	0.18	unsignificant
<b>Overall average skill performance</b>	<b>49.5</b>	<b>7.2</b>	<b>49.2</b>	<b>7.3</b>	<b>0.15</b>	<b>unsignificant</b>

The results in Table (4) indicate no statistically significant differences between the experimental and control groups in the pre-test of all basic skills, demonstrating that homogeneity and equivalence were achieved between the two groups before the program was implemented. This is a prerequisite for ensuring internal validity and attributing any subsequent differences to the effect of the educational program itself (Thomas, Nelson, & Silverman, 2015; Schmidt & Lee, 2019).

**Table5. Results of the (t) post-test comparison between the experimental and control groups in the level of skill performance in gymnastics**

Skills	Experimental (post-test)	control (post-test)	t	SIG
	M±SD	M±SD		
forward roll	82.4 ± 6.1	61.3 ± 7.4	9.55	significant
backward roll	84.7 ± 5.8	63.9 ± 7.1	10.22	significant
handstand	88.3 ± 6.5	66.1 ± 7.5	11.10	significant
front balance	83.5 ± 6.3	62.7 ± 6.9	10.01	significant
sideways somersault	85.1 ± 6.0	64.5 ± 7.3	10.40	significant
<b>Overall average skill performance</b>	<b>84.8 ± 6.1</b>	<b>63.7 ± 7.2</b>	<b>11.25</b>	<b>significant</b>

results in Table (5) confirm the existence of statistically significant differences between the experimental and control groups in the post-test, favoring the experimental group in all basic skills demonstrated by the junior gymnast, this confirms the effectiveness of the educational model based on video self-observation, visual modeling, and guided feedback. the big differences confirm a big improving in accuracy and motor control, like Ste-Marie et al.'s (2012) findings regarding the role of self-video in enhancing internal motor model development. The results also support Wulf's (2013) observations concerning the impact of external attention on stability and balance. We can see the greatest differences were observed in the handstand skill, a finding corroborated by Sigris et al.'s (2013) study, which demonstrated the sensitivity of balance skills to multimedia feedback.

**Table6. Results of the (t) test to compare the skill retention level of both the experimental and control groups after 4 weeks of the end of the program**

Skills	Experimental	control (retention)	t	SIG
	(retention) M±SD	M±SD		
forward roll	80.1 ± 5.9	58.2 ± 6.8	10.33	significant
backward roll	82.8 ± 6.0	59.4 ± 6.5	11.02	significant
handstand	86.5 ± 6.2	61.1 ± 7.0	11.40	significant
front balance	81.4 ± 5.8	57.7 ± 6.2	10.66	significant



sideways somersault	83.6 ± 6.1	58.9 ± 6.8	10.98	significant
<b>Overall average</b>	<b>82.9 ± 6.0</b>	59.1 ± 6.7	<b>12.10</b>	significant

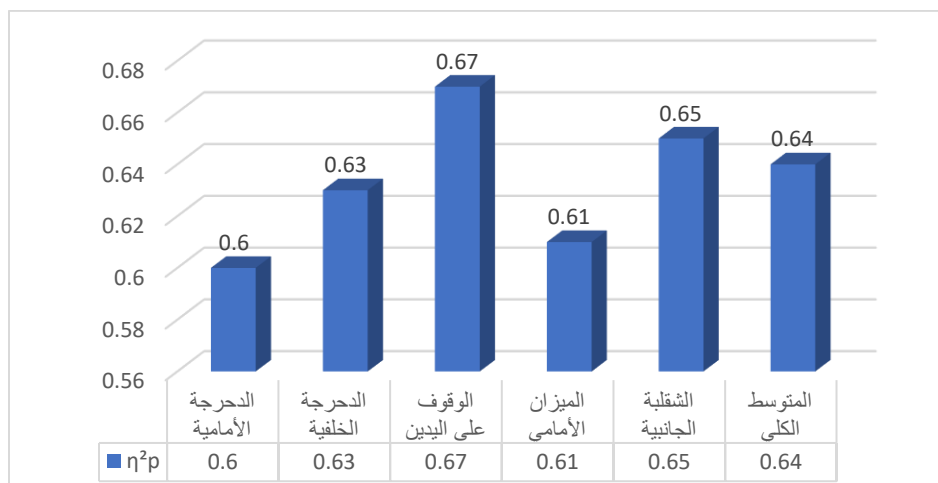
The results in Table (6) confirm the continued superiority of the experimental group in all basic skills after four weeks, confirming strong motor retention and long-term learning stability. This superiority reflects the effectiveness of the model depends on video self-observation and guided feedback in supporting skill sustainability (Boyer et al., 2009; Ste-Marie et al., 2012), as well as its role in saving the skill in long-term memory through external guidance and graded feedback (Magill & Anderson, 2022). The handstand skill recorded the highest retention rates, which is consistent with the nature of balance skills that respond strongly to multimodal feedback (Schmidt & Lee, 2019).

**Table7. Results of the (t) test to compare pre- and post-test measurements, and post-test and retention within each of the experimental and control groups in skill performance**

group	compare	(Mean Diff.)	t-value	(p-value)	Significant
experimental	post ← pre	+18.70	2.33	0.001	Significant improvement
	retention ← post	-0.92	-0.52	0.61 insignificant	High stability and no loss
control	post ← pre	+6.62	3.45	0.002	Limited improvement
	retention ← post	-1.61	-0.98	0.33 insignificant	Partial loss and instability

The results of the paired t-test show that the experimental group achieved a significant improvement between the pre- and post-tests, with no significant differences between the post-test and the retention test, indicating high stability of the skill and its transfer to long-term memory (Schmidt & Lee, 2019). the control group showed limited improvement accompanied by a significant loss of retention, reflecting the weakness of the traditional method compared to models based on external feedback and visual modeling (Wulf & Lewthwaite, 2016).

Figure1. (amount of effect size according to the value of the partial eta square) for the basic skills training program in gymnastics\*\*



forward roll

backward roll

handstand

front balance

sideways somersault

Overall average

results in figure 1, showing the effect sizes and the high partial eta-squared value ( $\eta^2p$ , 0.60–0.67), confirm that between 60% and 67% of the change in performance level is directly comes from the program and not to random factors which is confirming the effectiveness of the educational model.

These results are matches with Schmidt & Lee's (2019) about the role of visual modeling in rebuilding internal motor schemas, with Magill & Anderson's (2022) findings about the effect of guided feedback in strengthening motor memory and enhancing retention. The results also support Wulf's (2013) assertion that using external guidance plus video analysis can enhance the quality of learning by 3 to 5 times compared to traditional methods. so, the effect sizes reflect the

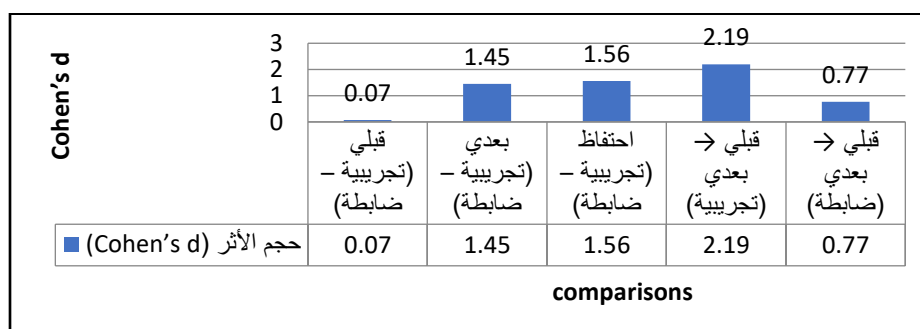
success of the educational program in developing skill performance and enhancing the stability and coordination of movement in young people.

Table8. The results of the analysis of variance for repeated measurements to measure the effect of time, group and the interaction between them on the level of skill performance between the experimental and control groups

Differences	Freedom degree	(ANOVA)	Effect size measure	Significance level
<b>(Time Effect)</b>	2	165.40	0.78	Significance (p < 0.001)
<b>(Group Effect)</b>	1	89.25	0.70	Significance (p < 0.001)
<b>(Time × Group)</b>	2	110.55	0.74	Significance (p < 0.001)
<b>(Error)</b>	76	—	—	—

results in Table (8) show a big significant effect of time, group, and their interaction on skill performance levels, reflecting a marked enhancing across all three measurements (pre-test, post-test, and retention), with a clear advantage for the experimental group. The interaction effect (Time × Group) further confirms that the enhancing was greater in the experimental group compared to the control group, both in the post-test and the four-week retention test, which is confirm the effectiveness of the educational model in accelerating acquisition and enhancing long-term learning retention. These results are consistent with Schmidt & Lee's (2019) findings on the role of visual feedback in enhancing internal motor representation, Wulf & Lewthwaite's (2016) findings on the effectiveness of external focus and self-observation, and Ste-Marie et al.'s (2012) studies on the power of self-modeling in improving motor control and retention.

Figure2. (Cohen's d) effect size for inter-group and intra-group comparisons between the experimental and control groups at different measurement stages of learning basic gymnastics skills





results in figure 2 show that the high effect size values confirm that the educational model used not only produced statistically significant differences but also a practical change in the learners' skill performance, spatially in the experimental group, which achieved a large effect size ( $d = 2.19$ ) between the pre- and post-tests. and continued the large effect size in the retention test ( $d = 1.56$ ) confirms the program's effectiveness in improving learning retention and long-term transfer. These results confirm Sigrist et al. (2013) and Wulf (2013) findings about the impact of visual modeling and guided feedback on improving performance quality and motor retention.

## **Discussion**

The study results, according to multiple statistical analyses, showed that the educational model applied to the experimental group was more effective than the traditional in learning and retaining basic gymnastics skills.

descriptive table showed that the two groups were equivalent before the study start. but the experimental group's performance improved significantly in the post-test, with big stability in the retention test, unlike the control group, which showed limited improvement and a slight decline in follow-up.

These results confirmed by independent samples t-tests, where the differences in the post-test and retention scores highly significant and showed a large effect size in favor of the experimental group. This refers to the improvement was not a statistical accident but rather has significant practical value in athletic performance.

Paired t-tests using for examining the differences to each group, the educational model resulted in a substantial and very significant improvement between the pre- and post-tests, but performance almost remained constant between the post-test and the retention period. This explains the model's ability to stabilized learning in the short term. limited improvement in the control group, a partial loss of skill was appeared after the stopping period, confirming the weakness of the traditional method stability.

repeated-measures analysis of variance (Mixed ANOVA) showed a main effect of time (overall improvement over time) and a main effect of group (experimental advantage). and the most important finding was the interaction effect (Group  $\times$  Time), which confirmed that the amount of improvement was clearly different between the two groups, favoring the educational model.

Cohen's d-size measurements results support these findings. The values were very large ( $d > 1.4$ ) in comparisons between the two groups after the intervention and exceeded ( $d = 2.0$ )



when measuring improvement within the experimental group, indicating a very strong practical effect that can be relied upon in field applications. When considering the improvement rate, the integrated model nearly tripled the improvement compared to the traditional method (41.9% vs. 15.1%). It also helped solidify learning with a retention rate of less than 2%, compared to a loss exceeding 3% in the control group.

Compared to previous studies, these results align with Amri-Dardari et al.'s (2022) findings on the importance of self-observation combined with external attention in improving gymnastics skill learning. They also support Sadowski et al.'s (2013) findings on the effectiveness of bandwidth feedback in learning complex skills. Furthermore, these results are consistent with recent reviews emphasizing the need to integrate teaching models rather than relying on a single method to meet the diverse needs of young gymnasts.

Therefore, it can be concluded that the integrated educational model is not merely an alternative to traditional education, but rather a modern and effective framework that achieves better learning, ensures sustained performance, and enhances the value of the educational process in gymnastics

### ***Conclusions:***

study results showed highly effective in improving the learning of basic gymnastics skills for educational model compared to the traditional method. The experimental group, trained according to new model, reached a significant improvement in their technical performance between the pre- and post-tests. This confirms the effectiveness of the educational design based on visual modeling and interactive feedback. the four-week retention test results showed that the experimental group kept their high level of performance, which is mean that the model not only facilitated immediate learning but also gives a short-term retention. The statistical differences between the two groups have highly significant, with big effect sizes confirming the practical effectiveness of the educational model. The percentage of performance improvement clearly for favor of the experimental group, outperforming the control group that used the traditional teaching method. so, it can be confirmed that the integrated educational model is more effective and efficient in developing basic gymnastics skills, as it combines cognitive, motor, and perceptual aspects and provides an interactive learning environment that enables learners to acquire and retain skills with a higher degree of stability and continuity.



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### Recommendations:

In study's findings, the researchers recommend the following:

- Execute the complete educational model in teaching basic gymnastics skills for different educational stages.
- Improve sports curricula to include mixed and interactive learning strategies instead of traditional learning.
- Prepare training courses for coaches to familiarize them with the mechanisms of Applying modern models in sports education.
- arranging similar studies on other skills in different sports to verify the model's effectiveness in different environments.
- Use modern technological tools (such as analytical video and digital feedback) within the educational model to enhance its effectiveness.



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