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THE IMPACT OF AN EDUCATIONAL PROGRAM ACCORDING TO THE VARK MODEL USING AUXILIARY MEANS ON THE ACCURACY OF FENCING

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Abstract.
The importance of the research lies in developing an educational program for the skill of fencing according to the VARK model at the training center for fencing in Al-Muthanna Governorate, and providing Iraqi trainers with the importance of using this model, which is considered one of the modern patterns in learning the technical performance of the skill that should be emphasized when developing educational programs under conditions that are suitable for fencing sport. This is to benefit from it during its application by those working on it, as the research problem was that most trainers in training centers provide training units that lack educational units that are inconsistent with the kinesthetic learning process and its various patterns. They start giving educational units late in the learner's life, contrary to what is seen in advanced countries where they provide the skill to the learner at an early age using modern and different methods and patterns that help in the learning process of the skill in a way that makes it easier for the learner to memorize and recall the skill. Therefore, the researchers saw the use of the VARK model in improving the learning process, which is one of the important stages in the kinesthetic learning process, as it is one of the modern methods in the learning process, and moving away from traditional patterns that limit the training age for the learner. The research aimed to prepare an educational program according to the VARK model using assistive means in the accuracy of fencing among saber fencers and to identify the impact of the educational program according to the VARK model using assistive means in the accuracy of fencing among saber fencers in Al-Muthanna Governorate. The research hypotheses were that there are statistically significant differences between the control group and the experimental group in favor of the experimental group as a result of using educational means according to the VARK model in the accuracy of fencing among saber fencers.

Introduction

Introduction to the Research and Significance:
Sports achievements have made significant advancements in recent years in the scientific field. The tremendous cognitive explosion and knowledge revolutions are clear evidence of this. Learning approaches and methods have diversified significantly in the educational process. While there is no one best method, it is important to choose the most suitable and cost-effective methods for kinaesthetic learning. In order to elevate the sports reality to a level that aligns with modern methods and techniques, athletes need to be physically and skilfully prepared to face the challenges they encounter in their sports lives and perform efficiently.

These skills can be developed and enhanced through the VARK model, which is based on different learning styles (auditory, visual, reading/writing, and kinaesthetic). This model includes physical and motor movements performed by learners. Such activities allow them to express themselves and recognize their physical and motor abilities. By gradually introducing various comprehensive movements involving all parts of the body (mobile and stationary), we can sense the inclination of the child or learner towards good performance. By not introducing modern methods and techniques for learning skill performance that align with the learner's abilities and capabilities, it becomes difficult for them to retain and retrieve the skill, and to develop a sense of pleasure and love for the skill. Therefore, researchers have resorted to using the VARK model, believing that it leads to good accuracy and better performance, thus promoting critical thinking and mental activation. This positively reflects on the level of accuracy to achieve the correct motor performance of the skill being learned.

The importance of this research lies in developing an educational program for the skill of fencing according to the VARK model at the training center for fencing in Al-Muthanna Governorate, and providing Iraqi coaches with the importance of using this model, which is considered one of the modern patterns in learning technical performance skills that should be emphasized when developing educational programs under conditions that are compatible with the sport of fencing. This will enable them to benefit from it during its application by those working on it.

Research Problem:

Fencing is a sport that particularly relies on an individual's physical, skilful, and motor abilities to achieve good performance. Therefore, it is necessary to have modern means that enable individuals to improve their skill level. Kinaesthetic learning is one of the scientific methods adopted by trainers to achieve this improvement. Learning based on modern scientific facts, especially regarding motor performance, allows us to understand and comprehend the details of movements and develop appropriate methods to enhance this performance. This provides us with indicators through kinaesthetic learning and the accompanying errors that can be overcome in the learning process. As researchers who are teachers and trainers at the College of Physical Education and Sports Sciences, we have noticed a lack of accuracy in fencing thrusts. Most trainers in training centers provide training units that lack educational units, which contradict the kinaesthetic learning process and its various styles. They start with late educational units for learners, contrary to what we see in advanced countries, where they provide learners with the skill at an early age using modern and different styles and methods that facilitate the learning process for the learner. Therefore, the researchers saw the use of the VARK model as a means to improve the learning process, which is an important stage in kinaesthetic learning. It is a modern method that moves away from traditional patterns that limit the training age for the learner.

Research Objectives:

1. Developing an educational program according to the VARK model using supportive means to improve the accuracy of thrusting among fencers.

2. Identifying the impact of the educational program according to the VARK model using supportive means on the accuracy of thrusting among fencers.

Research Hypothesis:

There are statistically significant differences between the control group and the experimental group in favour of the experimental group as a result of using the educational means according to the VARK model in improving the accuracy of thrusting among fencers.

Research Scope:

1. Human Scope: Fencers at the training center aged 11-13 years.
2. Time Scope: From September 13, 2021, to January 10, 2022.
3. Spatial Scope: Fencing Training Center, Al-Muthanna Governorate.

Identification of Terms:

VARK model defined VARK as the way in which the learner receives knowledge, information, and experiences, and the way in which information is organized, symbolized, integrated, and retained in their knowledge store, then retrieves information and experiences in the way that represents their way of expressing it.

Research Methodology and Procedures:

Research Method:

The researchers used the experimental method with a post-test design for the experimental and control groups. The experimental method involves intentionally and systematically changing specific conditions of an event, observing the resulting changes in the event itself, and interpreting them. In order to obtain answers to the research hypotheses, it is necessary to use an appropriate experimental design, which is essential in experimental research. Therefore, the researchers used the design of equivalent experimental and control groups with pre-test and post-test measures.

Research Population and Sample:

The researchers deliberately selected the research population from the players of the fencing training center in Al-Muthanna Governorate, aged between 11 and 13 years, who represent the governorate. The total research population consisted of 40 players. As for the research sample, it was selected deliberately from the research population and divided as follows, as shown in Tables 2 and 3.

Survey Research Sample:

The survey research sample consisted of 10 players from the fencing training center in Al-Muthanna Governorate. They were deliberately selected from the original population and used to test the measurement tools in the survey study and conduct scientific procedures to test the stabbing skill. They constituted a percentage of 25%.

Application Research Sample (Main Sample):

The application research sample (experimental and control groups) was deliberately selected from the fencing training center, consisting of 30 players. Two styles of VARK were selected (kinesthetic and visual styles), with a total of 24 players. Each style was divided into an experimental group and a control group through random allocation, with each group consisting

of 6 players. The experimental group applied the educational method according to the VARK strategy, while the control group applied the traditional method of the coach. Six players who had auditory and reading/writing styles were excluded, constituting a percentage of 60%. Through random allocation, the sample was divided into two groups:

- Experimental and control group (kinesthetic style): representing the fencing training center, consisting of 11 players. The educational method prepared by the researchers was applied to this group.
- Experimental and control group (visual style): representing the fencing training center, consisting of 13 players. The educational method prepared by the coach was applied to this group.

The aim of identifying the players' styles in the fencing training center for the researched skill (stabbing) is to understand the players' preferences and the suitability of the VARK strategy in developing those skills. The paragraphs were formulated in a multiple-choice format with four options, with each paragraph having only one choice. The kinesthetic style obtained a percentage of 36.67%, while the visual style obtained a percentage of 43.33%, which the researchers primarily relied on in their work. As for the remaining styles, the auditory style obtained a percentage of 13.33%, and the reading/writing style obtained a percentage of 6.67%. The researchers excluded the styles that obtained a low percentage and focused on the styles that obtained a high percentage, as shown in Table 1.

Table 1. Shows the number and percentage according to VARK styles for the research sample.

VARK Patterns	Number of Players	Total Sample Size	Percentage
Visual Style	13		43.33%
Kinaesthetic Style	11	30	36.67%
Auditory Style	4		13.33%
Read/Write Style	2		6.67%

Table (2) Distribution of the Sample and Percentage According to Groups for the Research Sample

Research Samples	Number of Players	Total Population Size	Percentage
Experimental and Control Group (Visual)	13		17.14%
Experimental and Control Group (Kinesthetic)	11	70	17.14%
Excluded Players (Auditory and Read/Write)	6		8.57%
Survey Experiment	10		14.29%
Standardization Sample of Pattern Identification Scale	30		42.86%
Total	70		100%

Homogeneity of the Research Groups and Their Equivalence:

Homogeneity of the Research Sample:

To determine the homogeneity of the individuals in the research sample, the researchers used the skill of stabbing, as indicated in Tables (3, 4, 5, 6). The results indicated that the four groups are homogeneous in the studied skills. The skewness coefficient ranged from (2.252-) to (0.665-), which is a good indicator because the values are within the range of (±3) included in the normal curve. If this value is zero or close to zero, it indicates that the distribution is symmetrical, suggesting homogeneity in the research sample, particularly in height, age, and mass.

Table (3) Homogeneity of Control Group Individuals

N.	Style	Variables	Measurement Unit	Mean	Deviation	Median	Skewness	Significance
1	Kinesthetic	Stabbing Accuracy	Degree	5.167	0.983	5.500	-1.012	Homogeneous
2	Visual		Degree	5.333	0.516	5.000	1.936	Homogeneous

Table (4) Homogeneity of Experimental Group Individuals

N.	Style	Variables	Measurement Unit	Mean	Deviation	Median	Skewness	Significance
1	Kinesthetic	Stabbing Accuracy	Degree	4.800	0.837	5.000	-0.717	Homogeneous
2	Visual		Degree	5.286	0.951	6.000	-2.252	Homogeneous

Equivalence of the Research Sample:

To avoid factors that may affect the main experiment results and to verify the equivalence of the two groups, the researchers treated and analysed the data related to the pre-test results of the sample, as shown in Table (5). The research sample received information, instructional guidance, and illustrative lessons before applying the skill test. Then, the pre-test was administered with the assistance of the supporting team (*). Afterward, the mean and standard deviation were calculated for the four groups in the pre-tests. The variance analysis for the tests was then extracted, ranging from (0.434) to (2.008) at a significance level of (0.731, 0.145), indicating their non-significance at a (0.05) significance level, with degrees of freedom between groups (3), within groups (20), and in total (23). Thus, there is no statistically significant difference between the experimental and control research groups for kinesthetic and visual styles in the pre-skill tests, as shown in Table (5).

Table (5) Shows the Equivalence of the Research Sample among the Four Groups

N.	Variables	Source of Variance	Sum of Squares	Degrees of Freedom	Mean Square	Calculated F Value	Significance
1	Stabbing Accuracy	Between Groups	0.938	3.000	0.313	0.434	0.731
		Within Groups	14.395	20.000	0.720		
		Total	15.333	23.000			

The Research Tools and Their Devices:

One of the things that help researchers in collecting their data and solving their problem to achieve the research objectives is the research tools, no matter what the tools are, whether they are data, samples, or devices, researchers need different data to complete their research. Therefore, they must choose the appropriate tools for data collection, whether they are secondary or primary. It is worth noting that there are many data collection tools that researchers can choose from to suit their research. Therefore, researchers use a set of devices and tools as follows:

Devices Used in Research:

- Electronic calculator.
- Video camera.
- Fencing arena.
- Two video films.
- CD discs.
- Whistle.
- 15 fencing swords.
- Stopwatch.

Research Tools:

- Arabic and foreign sources.
- Personal interviews.
- Survey form to collect experts' opinions on the validity of the VARK model paragraphs to determine VARK patterns.
- Data transcription form for VARK paragraphs.

Tests and measurements.

Field research procedures:

Determining the tests for the stabbing skill for the research sample:

Stabbing Accuracy Test (1)

- Test purpose: Measuring stabbing accuracy.
- Performance specifications: The indicator is placed on the field and then electrified. A line is drawn at a distance proportional to the player's stabbing length to start performing the stab. The player stands in front of the person in a ready position with the weapon (foil) connected to electricity behind the mentioned line. The player starts performing attacks (under study) towards the target (circles on the chest) designated by the coach, see figure (5).
- Test time: The player is given (10) attempts within a time of (15) seconds.
- Points calculation:

1. Points are given according to the stabbing location.
2. If the player does not stab inside one of the specified circles, zero points are given.

3. Points are divided according to difficulty levels (5, 4, 3, 2, 1).
4. The final result is the total of (10) attempts.

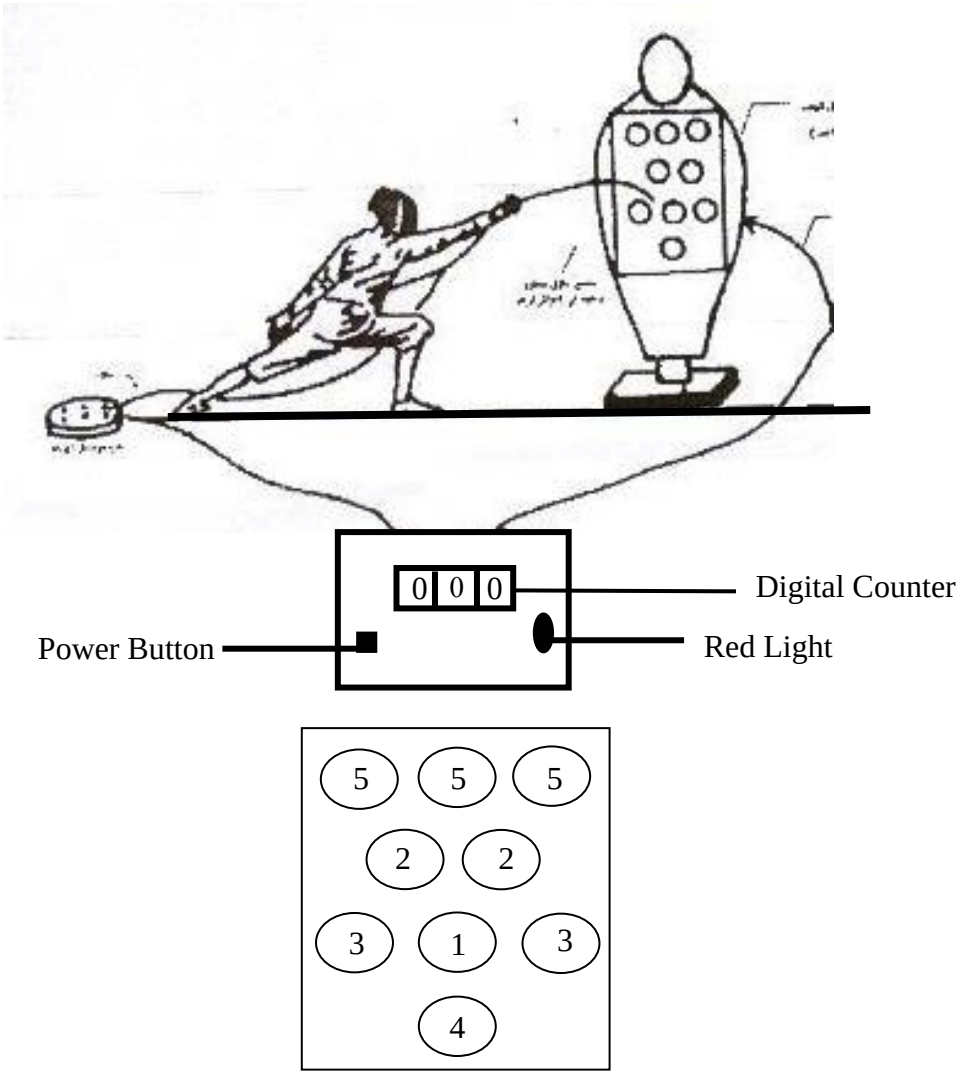

Figure 1. The test demonstrates the accuracy of the challenge.

Survey Experiment:

The survey experiment was conducted on a sample of (10) players from the training center for fencing in Al-Muthanna Governorate. The test was carried out on Sunday, October 4, 2021, at 4:00 PM in the training center hall for fencing. The researchers, with the assistance of the research team, conducted the experiment. The objectives of the survey experiment were as follows:

1. To determine the time required to conduct and implement the tests.
2. To assess the suitability of the tests for the research sample.
3. To ensure the efficiency of the assisting team.
4. To ensure the safety of the devices and tools used.
5. To assess the suitability of the registration forms.

Main Research Experiment

Preliminary Tests:

The researchers conducted the preliminary tests after preparing the research requirements, tools, and the assisting team. Under the direct supervision of the researchers, the preliminary tests for the stabbing skill were conducted on Monday, October 18, 2021, in the training center hall for fencing. After applying the tests on the players, the results were recorded according to the test conditions and specifications.

Educational Method (VARK Strategy):

The educational method is a plan that needs to be followed, and the physical education program is a set of planned experiences practiced by participants through sports activities (1). Therefore, a special educational curriculum was prepared according to the VARK model for the first experimental group (*) to improve stabbing accuracy. The curriculum consisted of 4 weeks, with 8 instructional units, i.e., 2 instructional units per week, with each unit lasting 65 minutes according to the requirements of the instructional unit. Thus, the total time for the two instructional units per week was 130 minutes. The curriculum included administrative and organizational activities, general and specific preparations, educational activities (explanation and demonstration of the skill), practical application (applying the skill by the research groups), and a concluding activity. The proposed schedule for the curriculum is as follows:

- Dividing the members of the experimental group, which is one of the requirements for the VARK model.

Each instructional unit includes the following:

A. Preparatory section: 17 minutes, including 9 minutes for general preparations (introduction) and 8 minutes for physical exercises (general and specific preparations).
B. Main section: 43 minutes, including 18 minutes for the instructional part, which includes explaining the skill and presenting the model, and 25 minutes for the practical application part.
C. Concluding section: 5 minutes, including cool-down and relaxation exercises, gathering the tools, and dismissal.

Table (6) Shows the Distribution of the Educational Unit Sections

N.	Educational Unit Sections	Unit Time (minutes/unit)	Number of Units
1	Preparatory Section	17	8 instructional units
	Organizational Aspect	10	
	General Preparation	3	
	Special Preparation	4	
2	Main Section	43	
	Educational Aspect	18	
	Applied Aspect	25	
3	Concluding Section	5	
Total		65	

The educational curriculum application:

After benefiting from the implementation of the definitional unit and preparing the lesson requirements from the technical aspects of the educational units and preparing the field of the training center, the assistant team, under the supervision of the researchers, began implementing the experiment on Tuesday, November 2, 2021, until November 16, 2021.

Post-tests:

After completing the educational curriculum, and under the direct supervision of the researchers, the post-tests for the accuracy of the stab were conducted on November 28, 2021, which corresponds to Sunday, in the training center hall for fencing satisfaction. After applying it to the players who underwent the test, the results were recorded according to the test conditions and specifications.

Statistical methods:

Statistics are "the science that investigates the collection, presentation, tabulation, analysis, and use of results in prediction, reporting, or investigation." To facilitate electronic programs, the researchers used the SPSS system to analyze the statistical data.

1. Percentage
2. Mean
3. Standard deviation
4. Analysis of Variance test
5. LSD test
6. t-test for correlated samples (non-independent)
7. Pearson correlation coefficient
8. Self-reliability coefficient

Displaying the results of the accuracy skill values for the control and experimental groups in the visual and kinesthetic patterns in the two-dimensional test and analyzing them:

N.	Variables	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F Value	Significance
1	Stabbing Accuracy	Between Groups	59.419	3	19.806	23.890	0.000
		Within Groups	16.581	20	0.829		
		Total	76.000	23			

Through Table (16), statistically significant differences were found in the results of the stabbing accuracy skill among the four groups in the post-test by calculating the value of (F), which was 23.890 at degrees of freedom (3-20) and a significance level of (0.00). To determine the direction of the differences in favor of any group, the researchers used the least significant difference (L.S.D) value among the four groups.

Table (8) shows the (L.S.D) for comparisons in the values of stabbing accuracy among the four groups for the post-test.

N	Variables	Mean Comparisons	Mean Difference	Standard Error	Significance
1	Stabbing Accuracy	Control Kinesthetic	Control Visual	8.167	7.167
		Control Kinesthetic	Experimental Kinesthetic	8.167	11.600
		Control Kinesthetic	Experimental Visual	8.167	9.429
		Control Visual	Experimental Kinesthetic	7.167	11.600
		Control Visual	Experimental Visual	7.167	9.429
		Experimental Kinesthetic	Experimental Visual	11.600	9.429

Through Table (8), it is evident that:

1. Accuracy values of stabbing: There was no significant difference between the control group (kinesthetic pattern) and the control group (visual pattern) at a significance level of (0.072). However, significant differences were observed between the control group (kinesthetic pattern) and the experimental group (kinesthetic pattern) at a significance level of (0.000), favoring the experimental group. Significant differences were also found between the control group (kinesthetic pattern) and the experimental group (visual pattern) at a significance level of (0.022), favoring the experimental group. Furthermore, there were significant differences between the control group (visual pattern) and the experimental group (kinesthetic pattern) at a significance level of (0.000), favoring the experimental group. Additionally, significant differences were observed between the control group (visual pattern) and the experimental group (visual pattern) at a significance level of (0.000), favoring the experimental group. Finally, there were significant differences between the experimental group (kinesthetic pattern) and the experimental group (visual pattern) at a significance level of (0.001), favoring the experimental group.

When observing the results of the analysis of variance (F), it is evident that there are significant differences in the studied skills in favor of the post-tests. The presentation of the aforementioned statistical tables reveals that the experimental group using the kinesthetic pattern outperformed the control group in terms of performance level in stabbing skills, as indicated by the least significant difference (L.S.D) test.

Similarly, the experimental group using the visual pattern excelled in performance level of the studied skills compared to the control group. At the same time, the results showed that the first group using the kinesthetic pattern outperformed the second group using the visual pattern, and the latter group outperformed the control group using the conventional method. These findings support the study hypotheses.

Researchers attribute the superiority of the group using the kinesthetic pattern over the two groups using the visual pattern and the control group to the regularity and continuity of the educational units in the curriculum. This had an impact on developing the skill performance

level of stabbing. The players underwent eight educational units over a period of two months, where they received regular education that catered to their desires and inclinations. The education was provided according to the VARK model, using the kinesthetic pattern, which provided an opportunity for the players to engage in various activities and exercises tailored to this type of education. This allowed them to discover their true level and perform activities according to their preferences. Moreover, the availability of a number of alternatives represented by diverse activities and exercises enabled the players to learn fencing skills by choosing what suited them best and interacting with colleagues who shared their inclinations and interests. It is worth noting that they had not previously learned with such effectiveness, which increased the possibility of learning the skills.

Conclusions and Recommendations

Conclusions:

1. The use of stimulating devices (auditory and visual) increases reaction speed, which reflects on the development of motor response and consequently enhances skill learning speed.
2. The VARK model plays a prominent and effective role in improving the technical performance level of the stabbing skill among the study sample individuals.
3. The experimental group that used the VARK model with auxiliary aids performed better in learning the stabbing skill compared to the control group.
4. Individuals with a kinesthetic learning style in the VARK model in both experimental groups performed better than individuals with a visual learning style.
5. The VARK model depends on the learner's preferences in finding correct solutions in performance and forming relevant motor pathways related to the researched skills.

Recommendations:

1. It is necessary to use the VARK model in the educational process when teaching skills for other sports activities.
2. It is essential to use diverse auxiliary aids in the educational process when teaching any skill in sports.
3. It is necessary to use educational media (static images and videos) in the educational process.
4. It is essential to use the VARK model with games and other activities.
5. Conduct a similar study to the current research on different age groups.

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