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TECHNICAL STAGES OF PERFORMANCE AS AN INDICATOR TO PREDICT STUDENTS' DIGITAL ACHIEVEMENT LEVEL FOR 110 METERSHURDLES RACE

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Abstract:

Predicting the digital level is a process that leads the student to become aware of something in his surroundings, and this process occurs immediately and suddenly, so attention must be paid to developing the student's sense and ability to control the shape of his body as he crosses the barrier and also focus on the three steps between one checkpoint and another in the 110meter hurdles race, the fastest runners follow the three-step approach, this means that there are three major steps to follow between all barriers,to do this efficiently, runners must take long strides and maintain their speed throughout the race.In light of the above, the research objectives are formulated as follows:

- Identify the relationship between each stage of the technical performance of the 110m hurdles run and the digital level for students.
- Finding a predictive equation for the students' digital level in terms of each stage of the technical performance of the effectiveness of the 110m hurdles run.

The researchers used the descriptive approach with two survey methods and predictive studies for the suitability and nature of the problem. The research community was determined by students of the second stage in the College of Physical Education and Sports Sciences / University of Babylon, for the academic year 2020/2021 AD, and their number (185) students, they selected a sample from that community by (98) students in the systematic random way.

Introduction:

Athletics is one of the games that its development is based on other sciences, foremost among which are tests, measurement and sports training, and by employing these sciences it is possible to develop the level of digital achievement for these activities and achieve an advanced digital level in proportion to the physical requirements of the movement or activity to be studied.

The continuous scientific development and advancement witnessed by the world in general and the Arab world in particular has had a great impact on the development of all fields, including the sports field, and the best evidence for this is the renewed global achievements and numbers in all sports and events, including the athletics game, especially the running event of 110 meters hurdles, as the performance reached the point of dazzling and fun during the Olympic and international championships.

The 110-meter hurdles event is one of the sporting events that have received great interest among researchers and specialists in order to raise students' physical and psychological levels, in addition to knowing prediction at the digital level through the technical stages.

Predicting the digital level is a process that leads the student to become aware of something in his surroundings, and this process occurs immediately and suddenly, so attention must be paid to developing the student's sense and ability to control his body shape as he crosses the barrier and also focus on the three steps between one checkpoint and another in the 110 meters hurdles race the fastest runners follow the three-step technique. This means that there are three major steps to follow between all barriers,to do this efficiently, runners must take long strides and maintain their speed throughout the race. If the student feels that he has started slowing down during the three steps, this may be an indication that he is unable to do these steps between all the barriers and may have to travel this distance in the manner of four or five steps. In the event that the distance between the barriers is cut in three steps, the student will use the same first leg to pass all barriers. But if he cuts the distance between the barriers in four steps, he must change the first leg at each checkpoint, since the student is in order to control his effectiveness performance. If the ability to predict the digital level, he needs a high degree of awareness of distance, time and body positions to try to stand on the scientific side. In order to guide the training and recommend the results we will reach, and to lead them to the best level of achievement.

The effectiveness of running 110 meters hurdles is one of the activities that need high and accurate technique in passing the barrier through the technical stages,from here came the importance of research in identifying the digital level for student achievement and prediction, as well as it is necessary to develop a predictive equation through the technical stages to know the digital level, thusit is possible to predict to obtain their results that can be used. Most of the predictive studies depend on predicting the significance of physical measurements, motor and physical abilities, or psychological variables ..... etc., and ignoring the process of predicting the significance of the technical stages of effectiveness, accordingly, the researchers attempted to address this shortcoming by finding scientific formulas to adopt the times of the technical stages of the effectiveness of the 110-meter run as a function of what the athletic level would reach in

order to select students who have high readiness to reach the best level of achievement. The priority as it is the main pillar that supports clubs and teams with distinguished players, there is no solution to this problem we discussed except through achieving the following objectives:

- Identify the relationship between each stage of the technical performance of the 110m hurdles run and the digital level for students.
- Identify the percentage of the contribution of each stage of the artistic performance to the effectiveness of running 110m hurdles in the digital level for students.
- Finding a predictive equation for the students' digital level in terms of each stage of the technical performance of the effectiveness of the 110m hurdles run.

As for the assumptions, they were as follows:

- There is a statistically significant relationship between each stage of artistic performance at the digital level for students.
- There is a varying percentage of participation in percentages for the technical stages of the 110-meter hurdles event at the digital level for students.
- The possibility of finding a predictive equation for the digital level for students in terms of each technical stage of the effectiveness of the 110m hurdles run

Research methodology and field procedures:

Research Methodology:

The researchers used the descriptive approach with two survey methods and predictive studies for the suitability and nature of the problem.

Research community and sample:

The research community is determined by students of the second stage in the College of Physical Education and Sports Sciences / University of Babylon, for the academic year 2020/2021 AD, and their number is (185) students.

Means of collecting information, equipment and tools used in the research:

Test and measurement, observation, and sources Arab and foreign references, a linen tape measure 50 meters long, one number, the athletics field at the University of Babylon, an electronic stopwatch, number (3), legal barriers, number (20) barriers

Field research procedures:

Determine the technical stages and their tests:

First: Achievement test for 110 meters hurdles race:

Test name: Achievement test for 110 meters hurdles race
Testpurpose: Measuring the digital level of student achievement 110 meters hurdles race.
Test description: The student sits on the starting line from the moment he hears the start-up signal, speeding to the finish line.
Register: Each student is given one attempt, and the time he travels is recorded in units of measurement for the second and its parts.

Second: Starting test from the starting line to the first barrier:

Test name: Starting test from the starting line to the first hurdle.
Test purpose: Measure the time taken to reach the first checkpoint.
Test description: The student runs from the starting line to the first checkpoint.
Register: Calculates the elapsed time.

Third: The test of passing the ten hurdles:

Test name: The test of passing the ten hurdles.
Test purpose: Calculating the time taken by the student to pass the ten hurdles.
Test description: The player runs from the starting line and the arbitrator calculates the time from the time the student crosses the first hurdle until he crosses the tenth hurdle.

Fourth:Test of running from the last hurdle to the end of the streak:

Test name: Test of running from the last hurdle to the end of the streak.
Test purpose: Measuring the student's performance time from the last checkpoint to the finish line to travel the distance from the last checkpoint to the finish line.
Test description: The student makes a quick run from the last point to the finish line**.**

The main experience:

The researchers conducted the main experiment on Monday, 21/12/2020 AD, at nine o'clock in the morning, on the research sample of (98) students with the help of the assistant team , on the playground of the College of Physical Education and Sports Sciences / University of Babylon. Conducting tests according to the following sequence:

First: Tests for predict procedures:

A sample of (98) students from the second stage was tested, as the time was calculated from the moment of departure from the starting line to the first checkpoint,and the calculation of the total time (the numerical level of achievement) from the moment of departure to the finish line, and then calculating the time from the first checkpoint until the crossing of the tenth, and the time of crossing the last barrier to the finish line.

The researcher used the following statistical methods (mean, standard deviation, (t) test, (F) test, simple regression equation, standard error, and simple correlation coefficient Pearson).

View results:

First: The statistical description of the research variables enjoyed by the sample members:

Table (1) : Shows statistical estimates of the results of the tests of the technical stages of the of 110 hurdles for students.

Technical stages	Measuring unit	Mean	Std. Deviation	Std. error
Running time from the starting line to the first hurdle	Second	2.59	0.23	0.03
Running time from the last hurdle to the finish line	Second	2.62	0.40	0.04
Time to cross the ten hurdle	Second	16.01	1.63	0.17

Digital level of achievement	Degree	21.62	2.01	0.21

In order for researchers to achieve the research objectives, they must investigate the anticipation of the result (the level of digital achievement running 110 meters hurdles) by students depending on the times of the technical stages of the event, especially those that contribute effectively to that level, and this may be done through building a reliable and efficient (predictive) model, after making sure of its accuracy in order to be able to generalize it in later research. In order to take the appropriate action in knowing the results of analyzing the available data on the investigated variables and in line with the achievement of those objectives, we highlight what is stated in table (1) as what we conclude is the moderation of the distribution of the research group in all the investigated variables, and the function of that is the zero values expressing the statistical indicators. Relevant to the distribution is like the standard error. What is important is that what this means is that the choice and size of this group of students are appropriate for building the predictive model for this study.

Second: The correlation between the results of the digital level of student achievement in relation to the times of the technical stages of 110 meters hurdles race.

In order to build a model for predicting the level of digital achievement for students running 110 meters hurdles in terms of the times of the technical stages of the event, the researcher must extract the estimates of the inter-relationship of the technical stages, as the results that he will obtain from the statement of these relationships will be one of the foundations on which to measure the efficiency of the model predictive, especially if we know that the value of the correlation coefficient has an amount and degree that indicates the strength of this relationship, as well as its direction, and that the construction of the model depends on both indicators, as the strength of the relationship indicates the extent of the influence and contribution of the times of the technical stages of the effectiveness at the level of digital achievement, as well as which of these stages will be the contributor the largest and most effective in demonstrating a model's ability to predict the level of digital achievement.But sometimes, indeed, the value of the correlation coefficient often does not tell us about the predictive power of the variables, and this means that it does not indicate causation, as it does not indicate the presence of an effect of the predictors (the times of the technical stages of activity) on the outcome variable (the level of digital achievement). In addition, high levels of linear correlation increase the likelihood that one or more of the good predictor variables will be missing, which helps in dispensing with them in the model, and this makes some researchers do not rely on these relationships when building the predictive model, but rely on extracting the indicators of the model on the indicators of the linear regression equation to build the predictive model. The correlation relationships between the studied variables were obtained by using the simple correlation coefficient (Pearson), either the amount and significance of the values of these relationships, especially the relationship of the results of the level of digital performance of the music to the of running 110 meters hurdles in terms of the times of its technical stages, we find it in the following table:

Table (2) : Shows the relationship of students' digital achievement level to the times of the technical stages of 110 meters hurdles.

Variables	Measuring unit	Correlation relationship		Sig type
Running time from the starting line to the first hurdle	Second	0.221	0.014	Sig
Running time from the last hurdle to the finish line	Second	0.454	0.000	Sig
Time to cross the ten hurdle	Second	0.499	0.000	Sig

What was stated in Table (2) is that all the relationships between the results of the level of digital achievement of students running 110 meters hurdles and the times of the technical stages for them have come to be significant in the sense that all technical stages and their different times have major contributions to the level of achievement. For example, the first stage (the time of running from the starting line to the first hurdle, the time of running from the last hurdle to the finish line, and the time of crossing the ten hurdles), it achieved high correlational coefficients, the amount of (0,221, 0,454, and 0,499) respectively, and since these relationships express the extent to which these times are related to the level of digital achievement, then they are what will be the basis for the statistical analysis processes in extracting the linear regression equation concerned with building the predictive model, the variable of transmission velocity has a relationship to physiological characteristics, physical abilities, harmonic movements during motor performance, angles that occur in the joints during performance, as well as the momentum that affects the whole in giving the body the movement and speed to be achieved and taking the best movement path, which is, in fact, reflections of the process of tension and relaxation of the participating muscle groups that were because of the exposure of the members of the experimental groups to new heights when learning on these hurdle, this triggered a new state of muscle work and the creation of new adaptations in terms of step frequency (time frequency of steps) and lengths of steps (new lengths of time) as a result of which an improvement in the level of transmission speed, as "the basis for the success of the speed of movement is to control and coordinate the speed in a way that serves the duty (WajihMahjoub and Ahmad Al-Badri: 2001)[(2)], and this was confirmed (Mufti Ibrahim 1998)[(3)] through the correct use of the laws of movement during the performance leads to an improvement in the speed of performance (Mufti Ibrahim: 1998)[(4)].

Third: Indicators of the predictive model (linear regression equation) and efficient criteria:

In order to evaluate the accuracy of the predictive model of the results of the research group, with the possibility of generalizing this model (the predictive linear regression equation), this model must be able to predict the performance of effectiveness and its accuracy through estimates of the technical stages contributing to the level of digital achievement, taking into account the possibility of its application to other groups. Similar or analogous to it,in order to achieve this, the researcher resorted to the multiple correlation coefficient between his times, the technical stages that contribute to the result (the level of digital achievement), and after statistical treatment of the available data, the results came as follows:

Table (3) : Shows the percentage of contribution of the times of the technical stages to the level of digital achievement:

Variables		Correlation type	Correlation value	R 2
Dependent	Independent			
Achievement	Stage (1)	Simple	0.221	0.49
	Stage(1,2)	Multiple	0.455	0.20
	Stage(1,2,3)	Multiple	0.612	0.37

What we got from table (3), is the estimated value of the coefficient of determination (R 2), which means the amount of the explanatory value of the model and the amount, respectively (0.49, 0.20, 0.37) as it expresses the percentage ratio of the interpretation changes occurring in the adopted variable (the level of digital achievement) due to the effects of independent variables (times of the technical stages),in short the ratio of the contribution of the regression equation to describing the variances and overall differences of the outcome (the level of numerical achievement), as long as the regression equation is based on including a limited number of factors - predictors - which usually explain a large part of the variance in the outcome. The other part of the result variance can be due to other factors or errors in the measurement.

As for the criterion of the efficiency of the model by testing (F) to measure the significance of the model parameters in one. That is, in the sense of determining whether there is a significant relationship between the result and the predictor, it can be known by shedding light on what was stated in table (4).

Table (4) : The regression model test.

Correlation relationship	Variance source	Sum of squares	Freedom degree	Variance	F value		Sig type
					Calculated	Errorpercentage	
Simple	Regressiondegree	19.075	1	19.075	4.930	0.029	Sig
	Error	371.430	96	3.869			
Multiple(1,2)	Regression degree	80.734	2	40.367	12.379	0.00	Sig
	Error	309.772	95	3.261			
Multiple(1,2,3)	Regression degree	146.050	3	48.683	18.720	0.00	Sig
	Error	244.456	94	2.601			

When highlighting what was stated in table (4), we find that all the parameters of the model were greater than the level of significance and this means that there is a significant effect of the independent variables (times of the technical stages) included in the model, which number (3) variables in the dependent variable (level digital achievement), we must say that the significance of the model confirms its efficiency, allowing the possibility of its use and generalization,because when the significance of a certain independent variable is wanted, the t-test (t) is adopted for the null hypothesis, which says: There is no relationship between the dependent variable (the result) and the independent variable (the times of the technical stages). Whereas, what came in table (4) of the values of the test (t) indicate that the calculated values of (t) are greater than the tabular value of all the independent variables. Therefore, the intended parameter is considered significant, which helps in the ability to draw the (predictive) regression equation inferred from the multiple regression analysis process in order to predict the result (the

level of numerical achievement), through knowing the amount of time for each stage of the 110-meter hurdles run and included in the analysis, and this in itself is a scientific indicator indicating the efficiency of this inferred model. For the application, we use the values of the constants (parameters) in building the model and extracting its equation,seen table (5).

Table (5) : Shows the values of the coefficients of the regression equation and the significant parameters of the model.

Model	Constants	Constants value	T value	Sig level	Sig type
Firstmodel	A	16.692	7.488	0.00	Sig
	B 1	1.897	2.220	0.029	Sig
Secondmodel	A	15.174	7.310	0.00	Sig
	B 1	0.251	0.288	0.774	Non sig
	B 2	2.218	4.348	0.00	Sig
Thirdmodel	A	8.899	3.978	0.00	Sig
	B 1	- 0.172	-0.220	0.826	Non sig
	B 2	1.863	4.042	0.00	Sig
	B 3	0.518	5.012	0.00	Sig

What is shown in the above table is that the fixed amount of any of the variables concerned with the times of the technical stages is significant in relation to the students' digital achievement level with the running 110 meters hurdles. From all the above, we conclude that the times of the technical stages run 110 meters hurdles race that contribute effectively to the evaluation of the result values (students' digital achievement level) in a manner that differs from one stage to another, and this is proven by the T-test values for each of them.

And since what we have reached, is that the model is able to predict the estimation of the value of the result, it is upon it: this model must be applied to know the expectations of the level of achievement of students, and according to what is intended by the following equations:

The first equation: the equation of the first model:
Achievement level = 16,692 + (1,897 * the value of running time from the starting line to the first hurdle)

The second equation: the equation of the second model:
Achievement level = 15,174 + (0,251 * the value of running time from the starting line to the first hurdle) + (2,218 * the value of running time from the last hurdle to the finish line)

The third equation: the equation of the third model:
Achievement level = 8,899 + (- 0,172 * the value of the running time from the starting line to the first hurdle) + (1,863 * the value of the running time from the last hurdle to the finish line) + (0.518 * the value of the time for passing the ten hurdle)

In order to verify the validity and validity of the model in achieving the outcome estimates (the level of digital achievement of students) in terms of the times of the technical stages, we take an example from the reality of the research, as we will deal here with the arithmetic means of the investigated variables concerned with the equation. Upon application, the result was identical to the value of the achievement level, which is (21.62).

(The first equation) Achievement level 21.64 = 16.692 + 4.94.
(The second equation) Achievement level 21.63 = 15.174 + 0.66 + 5.79.
(The third equation) Achievement level 21.62 = 8.899 + (- 0.45) + 4.87 + 8.30.

From this, we can be certain that this predictive model is efficient with a high degree of accuracy, validity and validity, as it can be generalized and used with similar or corresponding samples to the research group.

Conclusions and recommendations:

Conclusions:

- The emergence of varying rates of contribution of the times, the technical stages of the event, in assessing the level of digital achievement of students, effectively running 110 meters hurdles.
- The derived predictive model proved its efficiency according to statistically applicable standards

Recommendations:

- It is important to generalize the use of the prediction formula for the technical stages of the event, especially for athletics teams (the 110-meter hurdles run)
- The necessity of conducting similar studies on other athletics events.

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