Kinematics' Indicators of Learning Stages of the Methods of Technical Performance in Long Jump Sport.

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Abstract

The research has aimed at designing three educational programs in order to learn long jump skill in athletics sport which are: sail method, hanging method and walking in air for one and half step method ,then identifying the kinematics indicators (displacement-speed-wheel) of technical performance of the three methods at the end of every stage which are (primary compatibility , good compatibility, perfection and the mechanism) .The experimental and descriptive methods have been followed using cinematographic analysis on a sample consisted of 30 first grad students of the faculty of physical education-Minia University, divided into three equal experimental groups. Observation, physical tests and experts` opinion were the most important means of data collecting. Results has shown the length of time of motor learning stage and the increasing of the kinematics variables values and the digital level of walking in air method then hanging method and finally sail method . The result has confirmed also ,variables of movement of centre of gravity of the body point , are the most important point of the anatomical points and the kinematics indicators, which used to identify or evaluate learning stages of technical performance that have been studied.

Introduction:

Athletics is the mother and the bride of the sport's games because of having many advantages such as, power, multiplicity of competitions, variety of performance and motion techniques from running to throwing and jumping so it is one of the most interesting and exciting sports such as its signal express (powerful-fastest-highest), all of these achieved in the Long jump competition, which had a super care from the researchers and specialists in spite of this care, it still needs more studying and care to reach the sportive impression by the three known performance methods which they are, squatting, attaching, walking in the air (space).The priority of each method differs from each player to the other in accordance with the preference and preparation of each player and also in accordance with the learning stage and the perfection of the player in each method. So it was necessary to increase the concentration and care by the well selection and the quality of teaching the player the needed technical performance which are the essential supports for reaching the best performance levels . Judgment on the quality of performance learning takes place by a self-sensitive method or by a sportive objective method that is the most important because of the high accuracy and not biased and that is by applying the vital mechanism rules on the performance by using some points and essential mechanical variables (Kinematics' Indicators) that to recognize any stage of the three learning stages (primary compatibility - good compatibility - fixing and perfection or mechanism) the player has reached from here we can easy direct the learner the right direction to achieve the needed aim .In this way confirm " Mohamed Brikaa " and " Khayreya ELsukary " 2002, that as soon as knowing the scientific bases of motor learning help the teacher or the trainer to has his correct judgment, in which belong to the learning tools, the period and substance of practice ,that prepared him to choose the equal technique and to discover the roots of shortcoming , that may appear in the performance (12:18). Here appears the search issue Throughout the researcher's notes and their specific scientific reading they found rareness in the studies that discussed the possibility of recognizing the motion learning stages (psychomotor) in a mechanical objective method for the Long jump performance methods which made them make this study.

Aim:

Designing and applying three educational programs of the long jump with the essential methods, the first "squatting", the second "attachment", the third is for walking in the air on the research sample, and recognizing on the :

1-Values of the Kinematics variables of performing the long jump skill with the three methods during the motor Good compatibility- learning stages (primary compatibility-fixing and perfection "mechanism")

2- Kinematics Indicators values , that refers to each stage of the three learning stages ,which equal average of the

variable value of performing long jump skill for the three search methods **the cure Kinematics variables** ,that have been studied ,include Enter speed, loss of Horizontal speed, Upgrade angle-enter, Upgrade angle-exit ,Upgrading distance enter , Upgrading distance exit , Scurrying speed, Scurrying angel , Height of starting point , Height of flying distance, Height of flying from earth , Landing angel , Landing distance ,Upgrading time ,Flying time ,Landing time , Full performance time , Full performance time , the total measured distance .

Method:

The experimental and descriptive methods have been followed on a sample ,which has been chosen by an intentional way from the first year students of the faculty of the physical education - El Mini University for the study year 2012/2013 for those who haven't learned the long jump skill before the age of 17-19 years old . which is thirty players has been divided into three equal experimental groups, the first group is to learn the squatting method, the second is to learn the attachment method, and the third is to learn the walking in the air method . The equivalence had been found between them as so :

Table (1)
Analysis of variance for the three research groups in the age changes, physicall, and mental (n=30)

Variables	Measuring Unit	Variation Source	Degree of Freedom	Squares Total	Squares Average	Calculated V value	Statistical Significance
Age	year	Between group	2	59.53	29.62	0.51	Not significance
		Inside group	27	1561.20	57.82		
Length	cm	Between	2	3.19	1.60	0.20	Not
		Inside	27	219.00	8.11		
Length	cm	Between	2	12.69	6.35	0.30	Not
		Inside	27	571.60	21.17		
Weight	kg	Between	2	0.03	0.02	0.06	Not
		Inside	27	7.33	0.27		
Flexibility	meter	Between	2	15.12	7.56	0.85	Not
		Inside	27	240.9	8.92		
speed	cm	Between	2	0.03	0.02	0.07	Not
		Inside	27	5.98	0.22		
fitness	second	Between	2	0.08	0.04	0.04	Not
		Inside	27	25.89	0.96		
Compatibility	second	Between	2	0.94	0.47	0.19	Not
		Inside	27	67.94	2.52		
power	cm	Between	2	4.09	2.05	0.45	Not
		Inside	27	121.70	4.51		
intelligence	degree	Between	2	4.09	2.05	0.45	Not
		Inside	27	121.70	4.51		

Scheduled value of (f) at level (0.05) =3.35

Schedule1 declares that the calculated (f) value less than the scheduled (f) value that means there is no statistical significance difference between the three groups of the research which means that they are equal in these variables. **The tests** have been performed in17, 19/3/ 2013 and it divided into : Physical tests **:** test of tendency on the box to measure the flexibility of the backbone muscles and the back of the thighs, running test of 30 meters to measure the transition speed, rebound running test to measure the fitness, numbered circles test to measure the neural and muscular compatibility, wide bounce of fixing test to measure the muscular ability of the legs (14 : 346, 381, 409, 425,399) **,** and Mental Tests **:** Cattle Test for General Intelligence (1-7) .

- Suggested Programs Implementation :

The first program had been implemented in the period from 24-3 to 16-4-2013, the second program from 24-3 to 23-4, the third program from 24-3 to 30-4-2013 all of them were having two courses (two educational units) per week, each unit time 60 sixty minutes in accordance with that the first program implementation took 4 weeks of 8 educational units, the second took 5 weeks of 10 educational units, and the third took 6 weeks of 12 educational units . They took in their mind in applying these programs the commitment of

the course time according to the list of the faculty and the content of the athletics subject of the first year of the faculty.

- Post and between-measurement :

The first measure or photo for all the groups at the end of the first week on 28/3/2013, the second was at the end of the second week on 4/4/2013, the third and final photo of the first group was on 18/4/2013 that was at the end of the fourth week, at the end of the fifth on 25/4/2013 was for the second group, at the end of the sixth week on 2/5/2013 was for the third group. All of this was in the sports club on El Mini University at twelve 12 o'clock Am . After performing the suggested educational programs for each group the best three students from each group had been chosen and their technical performance has photographed in average 5 attempt per each student, the best attempt per each student had been chosen and at least the best one per each group ,by this way it has been chosen the best attempt of the best player(ideal) per each group between 15 attempt according to the correct technical aspects and the clarity of the very small details of motor performance and the competence of the attempt for motor analysis , that has done by the experts

in athletics ,the best attempt the ideal per each group, has analyzed ,after each educational stage to recognize the kinematics indicators ,that have been studied in using the following **instruments and tools** : A Rest meter to measure the length and weight, 3 T.V camera Sony brand (25 mg/s), tripod provided by a water balance, guidelines and control marks which is sticky phosphorous strips at length 25 cm and width 2.5 cm put around the body-, 1 measuring unit 3 video cassette tapes (8 ml), a flasher to achieve the coincidence between the photo cameras, a computer attached with it the Motion Analysis Program (3D map). stop watch, a measure strip its length is ten meters, recording applications (personal date of the sample, date related to trials chasing, data of the photocopier locations, measuring the special physical abilities) and the questionnaire of the experts in the suggested educational programs .

- The used statistical instruments :

Arithmetic Average, Standard Deviation, Analysis of variance in one direction .

Results:

Table (2)
1) The Values of Kinematics variables for the long jump skill by three methods during the motion learning stages of the search samples groups

Squatting			Attachment			Walking in the Air			Group and Method	Stage
Perfection	Good	Primary	Perfection	Good	Primary	Perfection	Good	Primary	Indicators	
6.03	5.20	6.28	7.26	7	7.2	6.91	7	5.89	Enter speed	Enter &upgrade
0.46+	0.92+	1.79-	0.49-	1.24-	0.97-	0.96-	0.65-	0.26-	Horizontal speed loss	
50.66	63.18	63.18	75.79	69.10	53.41	72.60	56.73	68.81	Upgrade angle-enter	
75.24	63.06	57.99	59.87	66.41	71.75	71.16	71.71	69.20	Upgrade angle-exit	
0.66	0.41	0.41	0.24	0.28	0.64	0.30	0.59	0.36	Upgrading distance-enter	
0.28	0.53	0.65	0.61	0.53	0.33	0.40	0.38	0.45	Upgrading distance-exit	
6.49	6.12	4.49	6.73	5.76	6.29	5.95	6.35	5.63	Scurrying speed	Scurrying
27.22	11.49	16.70	21.80	12.57	15.87	0.58	21.25	15.70	Scurrying angel	
1.06	1.03	1.03	1.06	1.22	1.01	1.18	1.17	1.18	Height of starting point	
0.40	0.11	0.04	0.15	0.22-	0.17	0.14	0.18	0.11	Height of flying distance	Flying
1.46	1.14	1.07	1.21	1.00	1.18	1.32	1.35	1.29	Height of flying from earth	
31.97	26.66	31.39	33.36	34.68	33.21	28.22	31.43	30.04	Landing angel	Landing
1.45	1.83	2.07	2.15	2.44	1.76	1.98	1.78	1.60	Landing distance	
0.12	0.16	0.16	0.16	0.16	0.20	0.12	0.16	0.16	Upgrading time	time
0.5	0.16	0.20	0.28	0.10	0.36	0.36	0.36	0.36	Flying time	
0.32	0.40	0.36	0.28	0.56	0.28	0.32	0.36	0.36	Landing time	
1.04	0.76	0.76	0.68	0.72	0.8	0.80	0.88	0.88	Full performance time	
5.13	4.30	3.76	4.73	4.40	4.16	4.45	4.33	3.95	Total distance	

Shape (2)
Enter speed of the long jump players by the three methods
squatting- attachment – walking in the air) during the learning stages
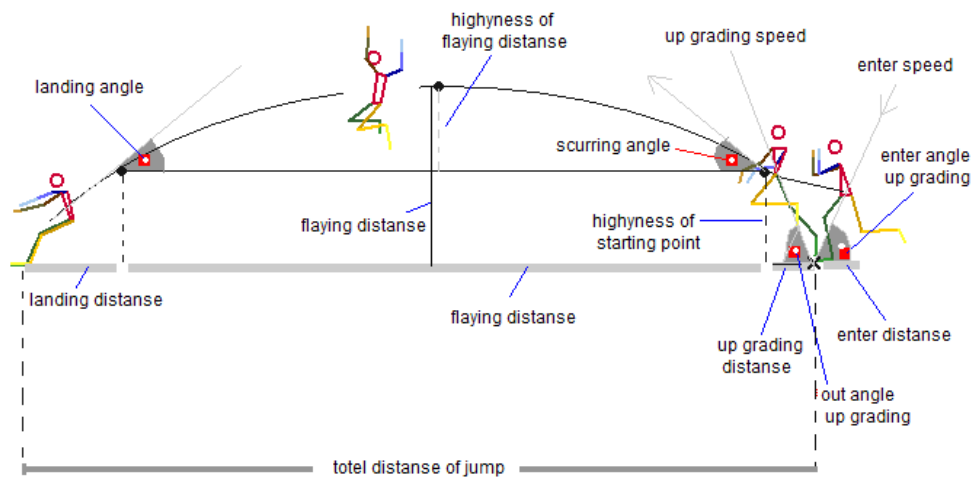
Shape (3)
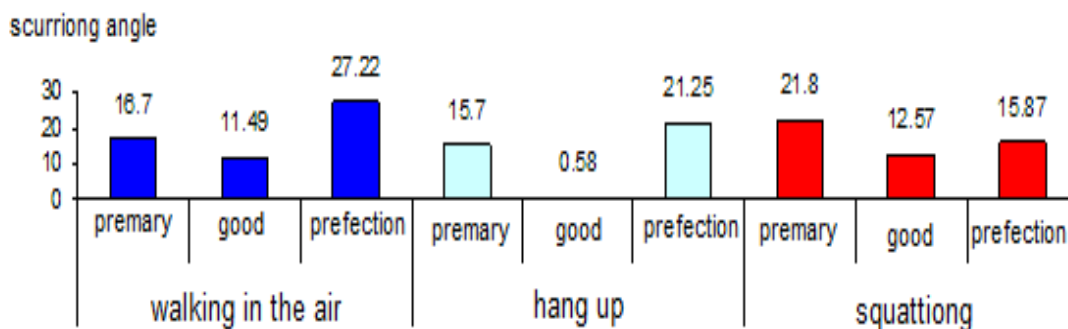**scurrying speed of the long jump players of the long jump players by the three methods**
squatting- attachment – walking in the air) during the learning stages
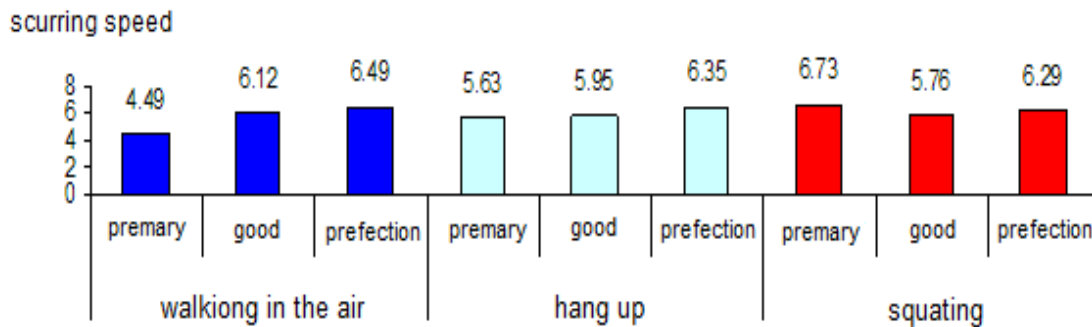
Shape (4)
scurrying angle of the long jump players by the three methods
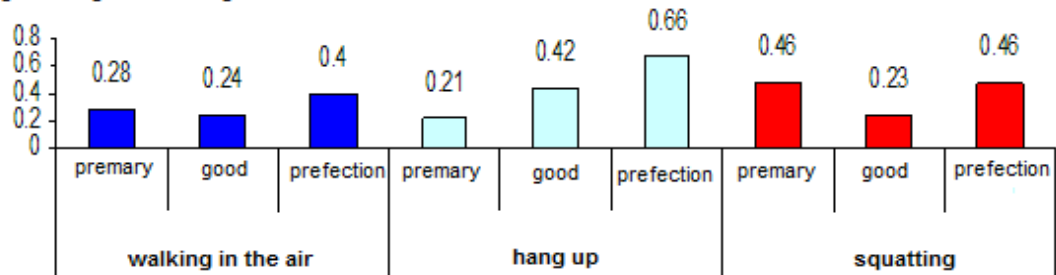**squatting- attachment – walking in the air) during the learning stages**

Shape (5)
flying distances of the earth of players of the long jump players by the three methods (squatting- attachment – walking in the air) during the learning stages

flying highyness

	walking in the air			hang up			squattiong		
	premary	good	prefection	premary	good	prfection	premary	good	prefecion
value	1.07	1.14	1.46	1.29	1.32	1.35	1.21	1	1.18

Shape (6)
distance between the center of gravity and the legs in landing of the long jump players by the three methods (squatting- attachment – walking in the air) during the learning stages

distanse between the c.g and legs in landing

	walking in the air			hang up			squatting		
	premary	good	prefection	premary	good	prefection	premary	good	prefection
value	0.28	0.24	0.4	0.21	0.42	0.66	0.46	0.23	0.46

Shape (7)
period of the total performance of the long jump players by the three methods (squatting- attachment – walking in the air) during the learning stages

peroid of the totel performance

	walking in the air			hang up			squatting		
	premary	good	prefection	premary	good	prefection	premary	good	prefection
value	0.76	0.76	1.04	0.88	0.8	0.88	0.68	0.72	0.8

Table(3)
2) Indicator values (average values of the variables) function kinematic on stage to perform the skill of learning the long jump three ways among a sample search

Perfection &fixing	Good compatibility	Primary compatibility	Stage		variable
06.73	06.46	06.40	m/s	Enter speed	Enter& upgrade
-00.32	-00.33	-01.01	m/s	Horizontal speed loss	
66.35	63.03	61.80	Angle	Upgrade angle-enter	
68.76	67.06	66.31	Angle	Upgrade angle-exit	
00.40	00.43	00.47	Meter	Upgrading distance-enter	
00.43	00.46	00.48	Meter	Upgrading distance-exit	
06.39	06.08	05.47	m/s	Scurrying speed	scurrying
16.33	16.09	15.10	Angle	Scurrying angel	
01.14	01.10	01.07	Meter	Heightof starting point	
00.23	00.11	00.02	Meter	Heightof flying distance	flying
01.33	01.18	01.16	Meter	Heightof flying from earth	
31.55	31.18	30.92	Angle	Landing angel	landing
02.02	01.86	01.81	Meter	Landing distance	
00.13	00.16	00.19	Second	Upgrading time	time
00.27	00.22	00.09	Second	Flying time	
00.44	00.33	00.31	Second	Landing time	
00.84	00.81	00.79	Second	Full performance time	
04.77	04.34	03.96	Meter	Total distance	

It is obvious in the previous schedule 2, 3 and figure (1-7) that the kinematics variable values and the kinematics indicators values (averages of variables values) it differs from an educational stage to another in the positive direction that refer to improving the education process in the three methods of bounce and each learning stage has a specific rate for these variables this rate indicates on reaching the student to this stage that is as mentioned in all Kinematics variables and indicators in the two schedules, owes this to the quality of preparation and implementing the suggested educational programs and to the regularity of the search sample in the educational units. Here indicate " Brieg . w " 1995, and " jose manuel " 1992 that the most important elemant to reach at high performed level in athletics is the good quality of planning and preparing and carrying out the educational programs ,observance of the correct scientific bases such as continuity, train , suitable load and the individual difference in these programs (6:148) (7:83) . and to attachment of the educational process with these indicators from the point of period and time of transition from an educational unit to another in all sides and details of the educational units, these indicators were a good standard to direct the educational process from a stage to another to reach to the mechanism stage in performing ,which consider the highest aim for educational process, in athletics field general and in long jump sepial . Here confirm " Ahmed Elian " 2009, Bridgett ,L.Galloway ,M ., that the most important kinematics indicator that affected in achieving the digital level of technical performance for long jump are scurrying speed and scurrying angle ,the heightof centre of gravity of the body in starting out moment as a conclusion of speed approaching and the power and speed of upgrade ,they confirmed also,the walking in air method is the best technique for long jump ,then it consider an extention of running process and complete it (3:4)(7:77).in this way indicate " Bastawisy Ahmed " 1997 and "Seyfarth.A.","Blickhan .R" 2000 that methods of long jump different between each other ,in the difficulty grad of performance and the needed period for learning to reach to the perfection (mechanism), which demand awareness and perseverance from the teacher or the trainer to control the performance of the learner and to direct him to the correct track (5:300) (15:743)

Conclusions:

- the best kinematics variables of the performance methods of the long jump , was in the perfection stage then good compatibility later the primary compatibility and on their head the walking in the air method then squatting .

- The most important Kinematics indicators (average of variables) that shows the educational stages (Primary compatibility – Good compatibility – fixing and perfection "mechanism") to perform the long jump skill by the three methods (squatting-attachment – walking in the air) for the search sample that represented in (speed, angle, distance,

and time) enter and quit of upgrading, scurrying point, flying path, landing path and that for the center of body gravity) in each educational stage of the different performance methods at the rate that mentioned in schedule 3.

- Kinematics indicators that are under study is at high efficiency in improving the motion learning operation of the long jump by the three methods that have been applied on the search sample.

Recommendations:

- Take in account the individual differences in between the learners in the kinematics variables values of performing the long jump skill by the three methods (squatting- attachment – walking in the air) during the different educational stages (Primary compatibility – Good compatibility – fixing and perfection "mechanism") About the period of time needed to reach these values in each educational stage.

- The interest of the Kinematics indicators in (speed, angle, distance, and time) enter and quit of upgrading, scurrying point, flying path, landing path and that for the body as basic criteria to know or judge on the learning stages that the learner or the group reach in the technical performance of the long jump skill by the three learned methods)

- To concentrate on the Kinematics indicators that under study as an important base for improving the learning operation in long jump skill by the three learned methods.

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