The effect of an educational program using the Cross-training on the Performance level of some complicated skills in hockey for students of the faculty of physical education

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Abstract: The research aims at recognizing the effect of cross-training on improving the physical sides and the performance level of some complex skills in hockey for the students of the faculty of sports education. The two researchers used the experimental method for one group. 20 students (44.44 % of the total of search society) were chosen as a sample by random intentional way. The main experiment, 16 educational units in 8 weeks, was carried. SPSS was used for processing the data. The results showed that there are statically significant differences between the pre- and post-test for the post-test at the physical abilities and performance level. The two researchers recommend with using the program of cross-training for teaching the complex skills of hockey to improve the technical performance of the students.

The introduction and problem of the research

The educational process with its challenges, faces a lot of problems which became a centre for studying in the field of education. The scientific research is the tool of society to solve its problems. The strategies of educational systems may differ in facing these problems according to the difference of educational reality in the world countries. The educational systems can not overcome its problems without working to renew itself and finding modern system for education, new in its aims, content and methods so that it can submit all effective factors in the educational process and the different self abilities of learner and all the helpful

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methods of learning for the educational process so that education gains its hopeful results.

The physical education has taken great steps towards progress and prosperity based on the results of researches of sports and physical education which contributed to rise of physical level and also the level of skillful performance for different sports activities .

The sports education plays an essential and important role in the life of peoples till it became one of the most marks that shows the progress and development of any country, so we must follow the scientific style as abase for more progress and development in sports education generally and hockey sports especially. The hockey sport is considered one of the sports activities that differs from other team sports activities that it requires skillful and physical requirements because there is a common factor between the player and the ball, this factor is the hockey stick.. (5 :34)

The motor skills in the hockey sport is the essence of performance and they are used in passing, changing the play direction, passing through, acquiring an area attacking the opposing team and kicking the ball towards the goal . El-Shahat,Mohammed (2006) referred to that hockey is one of the team sports which is distinguished from other team ones. The most of the team sports depend on the ball in playing it while the skills in hockey depends on the ball as well as the hockey stick in practicing it. The player needs to perfect the movement skills in hockey to reach the wanted high sports level (4:13).

Mostafa,Esam (2003) indicated that the physical preparation is considered one of the factors of success in sport and it is the first step to reach the perfect performance (16:78 ,81) Palesterious, Alvarez (1991) **,** Matveyev (1981) pointed to the importance of developing the motor skills where the right performance of the skill requires special motor abilities of the competitor. Moreover, developing the abilities of the player is considered one of the important factors to reach the highest sports levels (17:37) (13:262)

Hassan, Zaki (2004) indicated to that it appears

recently an organized form in sports field which is called the cross-training aiming at improving the special skill and physical abilities throughout using several activities and functioning devices or tools and techniques related to the special activity. In addition, this method of training leads the players to fun and excitement that increases motivation when carrying out the motor duties (9 :14-22). Matt Fitzgerald (2004)**,** Brislin. G, (1998) **,** Stamford, Bryant (1996),and Loy, S.F., Holland, C.J., Mutton, D.L., Snow, J., Hoffman, J.J., & Shaw, S (1992) mentioned that cross-training means variety of using modern technology from equipment and devices and exercises from the main activity to fulfill the main target which represents in improving the skill performance and developing the special physical abilities (12:3) (2:18) (20:238) (10:512). Elsayed , Mohammed ,Zian Mohammed(2003) mentioned that the cross-training helps to remove bored some feeling and causes a type of the spiritual adaptation. It increases the effectiveness of learning and stimulates the performer and making hem feel anxious and positive (3:382).

In the light of survey of studies and pervious researches which handled the methods of developing the skills and physical abilities, the two researchers found that any pervious study did not come to recognize how far the cross-training affect the special physical abilities and the skill performance level in the hockey sport.

Research Aim

In the light of above mentioned the two researchers want to recognize the effect of the cross-training on the physical abilities and the skillful performance in hockey by designing a program using cross-training.

Methods and Tools: The two researchers used the experimental methodology using the experimental design of one group by the pre- and post-test.

Research sample and society

Research society is represented in the students of the third grade of the teaching section, in the faculty of sports education, Mansoura university, in the academic year 2014 -2015. The total society was 45 students who study the hockey course. The

main sample was chosen randomly and it was (20) students from the total research society while the pilot sample was (10) students.

Research Sample Modesty

Sample modesty in main variables (age – length - weight), physical variables and skillful variables were emphasized as described in tables (1), (2) and (3).

Table 1. Research sample homogeneity   n= 20

No.	The tests	M. unit	Mean	Standard deviation	Median	Skewness
1	age	year	18.250	0.44	18	1.25
2	length	cm	174.95	4.48	174.50	1.54
3	weight	kilo	74.5	3.15	74	0.34

Table (1): clarifies that the skewness coefficient values of the research sample in (age – length -weight) lies between $\pm$ 3 which indicates the modesty of the research sample.

Table 2. Research sample homogeneity in physical variables n= 20

No.	The tests	M. unit	Mean	St. deviation	Median	Skewness
1	The maximum power	kilo	115.40	6.620	116	0.82
2	The muscle	cm	193.80	8.35	195	0.53
3	Flexibility	cm	12.70	3.02	14	0.27
4	Agility	Sec.	15.26	1.03	15.20	0.29
5	Accuracy	repetition	1.75	0.96	1	0.94

Table (2): clarifies that the skewness coefficient values of the research sample in physical variables lies between $\pm$ 3 which indicates the modesty of the research sample.

Table 3. Research sample homogeneity in skillful variables

No.	The tests	M. unit	Mean	Standard deviation	Median	Skewness
1	Receiving then passing by vertical hit by the flat face of hockey stick.	Sec	4.28	0.50	4.33	0.51
2	Receiving then by rolling advance then passing by vertical flat face of hockey stick.	Sec	6.34	0.63	6.24	0.04
3	Receiving then rolling then going on by passing through by the flat face of hockey stick.	Sec	8.47	0.73	8.37	0.74
4	Receiving then progressing by rolling and by hitting the ball by the flat face of hockey stick.	Sec	4.38	0.57	4.41	0.86
5	Receiving the progressing by rolling then going ahead by the flat face of the hockey stick.	Sec	13.53	0.95	13.32	1.36
6	Receiving and then progressing by passing through by the vertical flat hit	Sec	7.89	0.85	7.87	0.44
٧	Receiving then hitting by the flat face of the hockey stick.	Sec	3.41	0.34	3.38	0.24
٨	Receiving then going ahead by rolling then passing by flat face of hockey stick.	Sec	6.44	0.26	6.44	0.27

Table (3): clarifies that the skewness coefficient values of the research sample in skillful variables lies between ± 3 which indicates the modesty of the research sample.

The scientific features of the tests:
First: The Validity.

In order to assure the validity of the physical and skillful tests, the tow researchers measured the validity of the tests using validity which depends on the test ability to differentiate between tow groups, one of them is distinguished (advanced) from students specialized in hockey of the third grade (10 students) and the second is non-distinguished (lower level) group of the second grade. It was obvious that there were significant

differences between the two group in the physical and skillful tests.

Table 4. The difference between advanced and low level group in the physical variables (n=10)

No.	The tests	Measure unit	Advanced group		Low level group		T-test
			Mean	Standard deviation	Mean	Standard deviation	
1	The maximum power	kilo	134.70	7.87	115.90	8.53	*5.121
2	The muscle ability	cm	223.50	9.73	197.30	6.71	*7.60
3	Flexibility	cm	19.20	2.34	13.10	2.62	*5.57
4	Agility	Sec.	12.74	1.54	15.46	1.05	*4.73
5	Accuracy	repetition	3.70	0.48	1.70	0.82	*6.64

T value = 2.262

It is clear from table (4) that there are statistical differences between the advanced and low level group in the physical variables at the level (05,0) for the advanced group and that indicates to the testes validity.

Table 5. The difference between advanced and low level group in the skillful variables   (n=10)

No.	The tests	Measure unit	Advanced group	Low level group	T-test

			Mean	Standard deviation	Mean	Standard deviation	
1	Receiving then passing by vertical hit by the flat face of hockey stick.	Sec.	3.67	0.35	4.55	0.51	*4.49
2	Receiving then by rolling advance then passing by vertical flat face of hockey stick.	Sec.	5.89	0.42	6.84	0.43	*4.98
3	Receiving then rolling then going on by passing through by the flat face of hockey stick.	Sec.	6.22	0.75	8.59	0.82	*6.76
4	Receiving then progressing by rolling and by hitting the ball by the flat face of hockey stick.	Sec.	3.79	0.64	4.92	0.68	*3.89
5	Receiving the progressing by rolling then going ahead by the flat face of the hockey stick.	Sec.	12.94	0.75	14.66	0.82	*4.89
6	Receiving and then progressing by passing through by the vertical flat hit	Sec.	6.20	0.61	8.09	0.77	*6.15
7	Receiving then hitting by the flat face of the hockey stick.	Sec.	2.75	0.45	3.31	0.35	*3.45
8	Receiving then going ahead by rolling then passing by flat face of hockey stick.	Sec.	5.88	0.39	6.48	0.33	*3.68

T value =   2.262

It is clear from table (5) that there are statistical differences between the advanced and low level group in the skillful variables at the level (05,0) for the advanced group and that indicates to the testes validity.

Second: The Stability.

In order to assure the stability of the physical and skillful tests, test and re-test method on a sample of 10 students from the 3rd grade was applied.

Table 6. The correlation between the first and second test in the physical variables (n=10)

No.	The tests	Measure unit	First test		Second test		Correlation
			Mean	Standard deviation	Mean	Standard deviation	
1	The maximum power	kilo	115.90	8.53	120.09	9.97	*0.97
2	The muscle ability	cm	197.30	6.71	200.10	6.08	*0.95
3	Flexibility	cm	13.10	2.62	14.10	2.37	*0.87
4	Agility	Sec.	15.46	1.05	14.62	1.02	*0.97
5	accuracy	repetition	1.70	0.82	2.60	1.07	*0.85

r value = 0.632

Table 7. The correlation between the first and second test in the skillful variables (n=10)

No.	The tests	Measure unit	First test		Second test		Correlation
			Mean	Standard deviation	Mean	Standard deviation	
1	Receiving then passing by vertical hit by the flat face of hockey stick.	second	4.55	0.51	4.39	0.56	*0.94
2	Receiving then by rolling advance then passing by vertical flat face of hockey stick.	second	6.84	0.43	6.40	0.38	*0.78
3	Receiving then rolling then going on by passing through by the flat face of hockey stick.	second	8.59	0.82	7.65	1.20	*0.91
4	Receiving then progressing by rolling and by hitting the ball by the flat face of hockey stick.	second	4.92	0.68	3.85	0.87	*0.86
5	Receiving the progressing by rolling then going ahead by the flat face of the hockey stick.	second	14.66	0.82	13.74	0.47	*0.76
6	Receiving and then progressing by passing through by the vertical flat hit	second	8.09	0.77	7.07	0.68	*0.83
7	Receiving then hitting by the flat face of the hockey stick.	second	3.31	0.35	2.65	0.44	*0.68
8	Receiving then going ahead by rolling then passing by flat face of hockey stick.	second	6.48	0.33	5.62	0.69	*0.84

r value = 0.632

It is clear from tables (6) and (7) that there are statistical correlation between the first and second tests in the physical and skillful variables at the level (05,0) and that

indicates to the testes Stability.

The main study

1- Pre –Test: The two researchers did the pre-test on the research sample in the physical and skillful variables at 25.09.2014.   .

2- The main experiment: The main experiment was carried out from 27.09. to 20.11.2014. Two units weekly, 16 educational units, 70 minutes for each unit.

3- Post-Test : The two researchers did the post-test on the search sample in the physical and skillful variables at 22.11.2014.

Statistical analysis : The two researchers used (SPSS) to processing the data.

Results and Discussion

Table 8. The indication of the difference between the pre- and post-test of the research sample in the physical variables (**n= 20)**

No.	The tests	Measure unit	Pre- test		Post- test		Improv-ement percent	T-test
			Mean	Standard deviation	Mean	Standard deviation		
1	The maximum power	kilo	115.40	6.620	129.70	7.69	12.39	28.13*
2	The muscle ability	cm	193.80	8.35	213.75	10.37	10.26	8.05*
3	Flexibility	cm	12.70	3.02	14.45	2.89	13.78	9.20*
4	Agility	second	15.26	1.03	13.53	1.18	11.14	7.61*
5	accuracy	repetition	1.75	0.96	3.05	0.68	74.28	8.85*

1.729 = T value
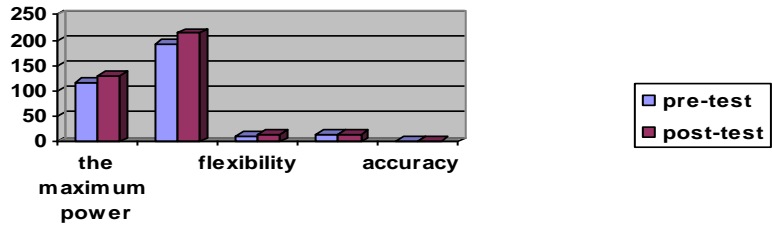
figure (1)

It is clear from table (8) figure (1) that there are statistical differences between the pre- and post-test in the physical variables at the level (05,0) for the post-test.

table 9. The indication of difference between the pre- and post-test of the search sample in the skillful variables (n= 20)

No.	The tests	Measure unit	Pre- test		Post- test		Improv-ement percent	T-test
			Mean	Standard deviation	Mean	Standard deviation		
1	Receiving then passing by	second	4.28	0.50	4.09	0.47	4.21	10.63*
2	Receiving then by rolling advance	second	6.34	0.63	6.12	0.62	3.47	14.17*
3	Receiving then rolling then going on by	second	8.47	0.73	8.25	0.74	2.59	22.97*
4	Receiving then progressing by rolling and by	second	4.38	0.57	4.15	0.56	5.02	27.62*

| No.	The tests	Measure unit	Pre- test		Post- test		Improv-ement percent	T-test
			Mean	Standard deviation	Mean	Standard deviation		
5	Receiving the progressing by rolling then going ahead by the flat face of the hockey .stick	second	13.53	0.95	13.30	0.95	16.26	27.04*
6	Receiving and then progressing by passing through by the vertical flat hit	second	7.89	0.85	7.68	0.85	2.66	8.88*
7	Receiving then hitting by the flat face of the hockey .stick	second	3.41	0.34	3.21	0.33	6.45	24.34*
8	Receiving then going ahead by rolling then passing by flat face of hockey stick.	second	6.44	0.26	6.20	0.29	3.73	12.82*

T value = 1.729
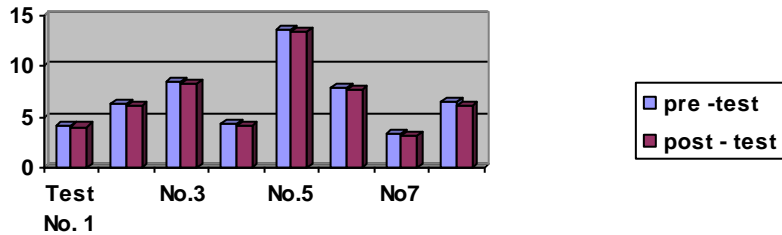
figure (2)

It is clear from table (9) figure (2) that there are statistical differences between the pre- and post-test in the skillful changes tests in the level (05,0) for the post-test in the skillful variables.

Discussing:

The results of table (8), figure (1) indicate that there are statistical differences between the pre- and post test at the level (05.0) for the post test in the physical abilities.

The two researchers indicate this improvements between the pre- and the post test due to the use of the suggested program of cross-training in turn contributed to improving the physical abilities level.

Mostafa, Esam (2003) indicates that the physical preparation is considered one of the most important elements of success in the sports activity performance. It is a beginning step to achieve the high sports

levels. The physical preparation is one of the most important bases that is depend on to reach to the ideal performance. Also it leads to developing the essential physical qualities that is distinguished to the type of activity that the sports man can specialize in and a trial to develop and work to reach the at most level of it to achieve the highest level of performance that they can do (16:78-81).

Brislin. G, (1998) mentioned that the cross-training is one of the shapes of modern organized shapes which use a variety of activities and untraditional methods aiming to developing the skillful level and thus it contributes in acquiring motor experiences which are reflected in improving the physical and skillful aspects (2:1).

Schmidt, Bleicher (1993) indicates that

employing cross-training in the program has an vital effect in developing the physical abilities owing to containing various activities and leads to adding cross-training in the program which gives more advantages where this trial to raise the level of physical fitness which in turn leads to increasing its effectiveness (19 :97).

This results are similar to what the study of Tanaka, H., Costill, D., Thomas, R., Fink, W.J. and Warrick, J.J. (1998) ,(21) , Hassan, Mohammed (2002) (8), Yahia hamdy (2006) (22), Sadik, Amal (2010) (18), Mahran,Wasela (2007)(11) and Ahmed.Yasser (2007) (1) which refer to that the cross-training has better positive effect on the special physical abilities than the other traditional ways methods.

The results of table (9) figure (2) indicate there are statistical differences between the pre- and post tests at the level (0.05) for the post test in the skillful variables.

The two researchers indicate this improvements between the pre- and the post test due to the use of the suggested program of cross-training in turn contributed to improving the skillful performance level.

Hassan, Zaki (2004) and Eric Small, Linda Spear: Kids & sports (2002) pointed out that the cross- training has a high degree of importance to raise the level of skillful performance. (9:13)(6:39)

Elsayed , Mohammed ,Zian Mohammed(2003) ensure that using the cross-training helps to remove the boredom feeling and causing a type of psychological adaptation and increasing the learning effectiveness besides it stimulates the performer and leads to making it responsive and positive (3:382). Thus the two researchers find that the cross-training method motivated the players in the research sample to exert more efforts to learn the skills which reflected in improving the skillful level.

Palesterious, Alvarez (1991) and Matveyev (1981) referred to the performance of the skill requires special physical abilities in which developing the physical abilities is considered one of the important factors to reach the highest sports levels (17:37) (13:262).

Esmaiel, EHAB (2004) **(7)** Mohammed,Yasser (2009) **(15),** Mohammed ,Maha (2007) (14) Mahran,Wasela (2007) **(11**) and Sadik, Amal (2010) **(18)** assured that functioning the cross-training has an effective influence to raise the level of skillful performance.

Conclusions

Throughout the results of the research, we reach to that the cross- training has a significant effect on improving the physical abilities and the level of skillful performance of hockey players (students of the sports education faculty).

Recommendations:

Throughout the conclusions which was reached, and within the limits of the samples in the research, the two researchers recommend the following:

1. Using the cross-training program in teaching Hockey to the students of the faculty of physical education.

2. Paying more attention to the cross-training method on applying training programs for the athletic Hockey teams.

3. Doing more research to investigate the effect of the cross-training on improving other hockey skills and various aging levels.

4. Putting the results of this research in front of the responsible ones in order to apply more scientific solutions to fix the defects of the skilled performance level in hockey.

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