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The effect of a proposed training program using modern technology in developing the swan diving skill of school volleyball team players

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ABSTRACT

THE OBJECT OF THE STUDY AIMS TO INVESTIGATE THE EFFECT OF A PROPOSED TRAINING PROGRAM USING THE KENOVIA SOFTWARE IN DEVELOPING THE SWAN DIVING SKILL OF THE SCHOOL VOLLEYBALL TEAM PLAYERS. FOR THIS PURPOSE, WE USED THE EXPERIMENTAL METHOD. ON A SAMPLE COMPOSED OF 12 PLAYERS, WERE RANDOMLY DIVIDED INTO FOUR EQUAL GROUPS (3 EXPERIMENTAL GROUPS AND A CONTROL GROUP). CHOSEN AS INTENTIONALLY, EACH EXPERIMENTAL GROUP USED ONE OF THE THREE TECHNOLOGY METHODS (WATCHING A REPLAY OF THE SELF-PERFORMANCE VIDEO OR WATCHING A VIDEO OF THE IDEAL MODEL OR WATCHING BOTH AT THE SAME TIME). AND FOR DATA COLLECTION, WE USED THE SWAN DIVING SKILL TEST. AFTER COLLECTING THE RESULTS AND HAVING TREATED THEM STATISTICALLY, WE CONCLUDE THAT THE KINOVEA SOFTWARE HAD A POSITIVE EFFECT IN DEVELOPING THE SWAN DIVING SKILL. THE METHOD OF WATCH THE VIDEO REPLAY OF THE SELF-PERFORMANCE WAS THE BEST. THAT IS WHY COACHES SHOULD FOCUS ON IT.

1.Introduction

The low level of physical activity in our society is often associated with technology, however, the use of technology can help develop the motor skills of students (Feher and Kaplan 2011). Using technology appropriately makes it an effective tool, and that's what the National Association for Sport and Physical Education believes (Durai 2016). The positive effects of the use of information and communication technology in the field of physical education and sports can be summarized in the following aspects: educational software, activity designing and planning, result recording, motion examination, biomechanics video analysis, performance comparing and synchronizing, distance and time measurements and activity evaluation (STANESCU, STOICESCU et al. 2011).

Technological, social and cultural changes greatly affect the educational field. These changes are reflected in the need to improve teaching methodology for physical education and sports specialists. The use of computers and other information technologies aimed at increasing the effectiveness of the educational process is a modern alternative (STANESCU, STOICESCU et al. 2011), in Dagstuhl symposium 15382, entitled “Modeling and Simulation of Sport Games, Sport Movements, and Adaptations to Training”. Experts on modeling and simulation from computer science and sports science were invited to discuss recent developments, problems and future tasks in these fields. The primary objective of the symposium was to continue interdisciplinary research in sports and computer science with a focus on modeling and simulation techniques. In conclusion, the symposium demonstrated that the disciplines mutually benefit from each other (Duarte, Eskofier et al. 2016). The technique of creating virtual simulations of movements is widely used in sports, and is an important supplementary method for teaching physical education (PE) (Yang 2014) , the data showed the potential for future use of video analysis as a teaching method to improve individual sports

skills and not only for the purpose of quantitative aspect of performance, statistics or tactics scheme (Napolitano, Perciavalle et al. 2017), video-Based Analysis (VBA) has become a widely used teaching method for effective teaching and learning (Ningthoujam 2016).

Experience shows that teacher functions such as organizing, encouraging, etc. may not be negatively affected when using video during a physical education lesson (Merian and Baumberger 2007), the self-made video model has many uses, such as an educational tool, a feedback tool, a visual perception of the skill, and as creating interest to the students (Ningthoujam 2016). Providing students with a view of their performance or feedback on what they have done is one of the goals of using video instructions in physical education (Durai 2016), based on the assumption that demonstration is more useful than verbal instructions or trial and error methods of skill development, it is also a widely used method in sports teaching and training (Lhuisset and Margnes 2015), because athletes are only able to remember 30-50% of the key performance factors they have seen, coaches and coaches use visual feedback from the hand as a corrective method that helps improve athlete performance, as recent evidence shows that it contributes to reaching the full range of motion, even for relatively fast movements (Durai 2016). In studies investigating the effects of physical guidance, video demonstrations, and task scheduling on a variety of motor skills, providing self-control (SC) during practice has been shown to enhance learning (Fairbrother, Laughlin et al. 2012).

The purpose of many studies was to explore the effect of training and educational programs on developing individual skills using modern technological applications represented in: iPad, DARTFISH, Windows Live Movie Making, Coach's Eye, tablet computer and Simi Motion® 2D/3D movement analysis system. The majority of these studies confirmed that the use of modern technological applications in teaching would help improve students' ability to learn motor skills and increase the

efficiency of their performance. (Feher and Kaplan 2011, Ste-Marie, Vertes et al. 2011, Ste-Marie, Vertes et al. 2013, Amara, Mkaouer et al. 2015, Madou and Cottyn 2015, Palao, Hastie et al. 2015, Bergin 2016, Ningthoujam 2016, Kretschmann 2017, Hung, Shwu-Ching Young et al. 2018, Taheri-Torbati and Sotoodeh 2019), one of the studies showed that the quantity and quality of feedback during and after skill implementation improves learning and retention of motor skills. And the use of technology in a purposeful way to achieve the desired learning results is one of the challenges in physical education (Feher and Kaplan 2011). The primary goal of high-quality physical education programs is to engage students in meaningful experiences that inspire them to be active both in and out of school. Perceived physical competence is one of the strongest influences on student participation in physical education (Bergin 2016). From a psychological point of view, the internal imagery always indicates conscious self-control of the movement being performed. Within an active educational approach to skill acquisition, it is defined in the context of sport as 'the creation and recreation of an experience generated from memorial information' (Rohleder and Vogt 2018). Unfortunately, our eyes and brains cannot process information fast enough to see all the details associated with the rapid and complex movement of the body. It has helped the use of Video camera, laptop and Data Shaw in this field, and this has been confirmed by many studies, despite the limited services that it provides us with (Winfrey and Weeks 1993, Guadagnoli, Holcomb et al. 2002, Menickelli 2004, Merian and Baumberger 2007, Lhuisset and Margnes 2015, Arbabi and Sarabandi 2016, Schmidt and Bradford 2016). Due to innovations in the technology of the pioneering motion analysis software, the Kinovea software came to provide several services used in many studies. (Durai 2016, Napolitano, Perciavalle et al. 2017, Napolitano 2018, Rohleder and Vogt 2018, Amri-Dardari, Mkaouer et al. 2020, Souissi, Ammar et al.2021), However, there is still disagreement over which technology does benefit from and which one does not, although there are many that can theoretically be applied to developing

skills (Potter, Tharion et al. 2013), the current study aimed to highlighting the role of using the Kinovea software in several ways such as watching a replay of the self-performance video, watching the video of the ideal model, or watching both at the same time, to develop the swan diving skill in volleyball for the school team players, and discover which technology does benefit from and which one does not.

2.Method and Materials

2.1. Participants

The study sample consisted of 12 volleyball players, which represented all members of the study population through a complete census of the Volleyball players of Mohammed Yakan Al Ghasiri High School team Arris - Batna - 2021/2020, and they were divided into four equal groups, with 3 players in each group:

Experimental group 1: represented 3 players in a pink shirt (height 3.21 ± 179.66, weight 16.07 ± 79.66, age 0.57 ± 17.33, experience 0.57 ± 5.33) as the method is applied to this group. Self-detection of the error by watching the video replay of the self-performance.

Experimental group 2: represented 3 players in a blue shirt (height 4.93 ± 179.66 weight 6 ± 64, age 1.73 ± 16, experience 4.16 ± 3.33) as the method is applied to this group. Self-detection of the error by watching the self-performance video replay + watching the ideal model video.

Experimental group 3: represented 3 players in a green shirt (height 4.50 ± 177.33, weight 4.93 ± 61.66, age 0 ± 17, experience 2.88 ± 3.33) as the method is applied to this group Self-detection of the error by watching the ideal model video.

Control group: represented 3 players in gray shirts (height 5.50 ± 177.33 weight 18.77 ± 69.33, age 1.15 ± 17,33, experience 2.88 ± 3,66) as the method is applied to this group the traditional method of error detection by teacher's instructions.

Training program: The training program was for a month and a half, 5 days a week, and all groups trained together, where the difference was in the method of correcting errors only.

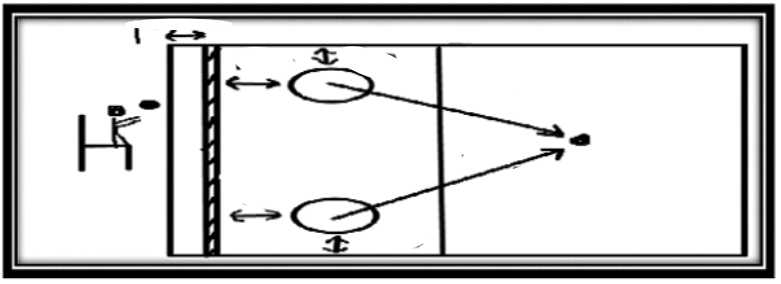
2.2. Materials

Laptop Lenovo ThinkPad, kinovea software - 0.8.15, The ivcam application, Xiaomi Redmi Note 8 2021 phone, Cable data, tripod, SAMSUNG TV B2030 - 20 inch, the swan diving skill test in volleyball:

The goal of the test: to recover the ball from the swan flight (dive). Necessary tools: volleyballs, legal volleyball court, bench, rope 10m, ruler 50cm, 50 cm between the rope and the grid, two circles 1 m in diameter. Performance specifications:

the player stands in position 6, and 3 m away from the center of the two circles drawn in position 2 and 4, the coach stands on a bench in the other half of the volleyball court and throws the ball between the rope and the grid into the two circles, with 5 balls per circle not in order. The player retrieves the ball with the swan dive, from positions 2 and 4, as in figure1. Scoring: 3 Points for each attempt in which the ball is above the net. Two points for each attempt in which the ball is between the two sides of the net. One point if the player touches the ball and fails to lift it. Zero if the player fails to touch the ball in the specified place. The maximum score for the test is (30) points.

figure. 1 the swan diving skill test. (uomustansiriyah.edu.iq)



2.1. Statistical Analysis

Data analyses were applied by using the statistical packet for social sciences (SPSS) 26.00 software program. The Mean (M),

Std. Deviation (SD), test of Homogeneity of variances, paired samples T test, One-Way ANOVA test, Post Hoc test.

3.Results

In table 01, the results showed that the Levene statistic for Homogeneity of variances in the pre- and post-test (0.66 and 0.11) respectively, and the significance is estimated at (0.59 and 0.95) respectively, which is greater than the significance level 0.05, so the variances is homogeneous in both the pre- and post-test.

Table. 1 test of Homogeneity of variances for the post-and pre-test of the swan diving skill

	Test	Levene statistic	Df1	Df2	Sig	A	Decision
Based on Median	Pre	0,66	3	8	0,59	0,05	homogeneous
	Post	0,11	3	8	0,95		homogeneous

Table. 2 paired samples T test to compare results of the post-and pre-test of the swan diving skill

Groups	N	test	Mean	Std. Deviation	T	df	Sig	α	decision
Experimental group 1	3	pre	11	1	-24,24	2	0,002	0,05	significant
		post	25	1					
Experimental group 2	3	pre	9,33	6,65	-4,25	2	0,051		Not significant
		post	20,66	2,08					
Experimental group 3	3	pre	12,33	1,52	-8,50	2	0,014		significant
		post	18	1,73					
Control group	3	pre	13,66	2,51	-4,15	2	0,053		Not significant
		post	17,33	2,30					

According to Table 2 by comparing the results of the post- and pre-test of the swan diving skill for each group, it was found that there are statistically significant differences between the pre- and post-test in each of the experimental groups 1 and 3 (0,002/0,014) at the significance level of 0.05 and in favor of the post-test (graph 1). While we did not record any statistically significant differences in the rest of the groups.

And also according to Table 3 by comparing the level of groups in terms of the results of the pre- and post-test of the swan diving skill test, it was found that there are statistically significant differences between the groups level in terms of the results of the post test of the swan diving skill test (0,004) at the level of significance 0.05 (graph 1) while We did not record any statistically significant differences between the level of the groups in terms of the results of the pre-test of the swan diving skill test, and this means that the groups had the same level in the beginning.

Table .3 One-Way ANOVA test for the post-and pre-test of the swan diving skill

Test		Sum of squares	Mean square	df	F	Sig	α	decision
Pre	Between groups	30,91	10,30	3	0,76	0,54	0,05	Not significant
	Within groups	108	13,50	8				
	Total	138,91		11				
Post	Between groups	108,91	36,30	3	10,62	0,004		significant
	Within groups	27,33	3,41	8				
	Total	136,25		11				

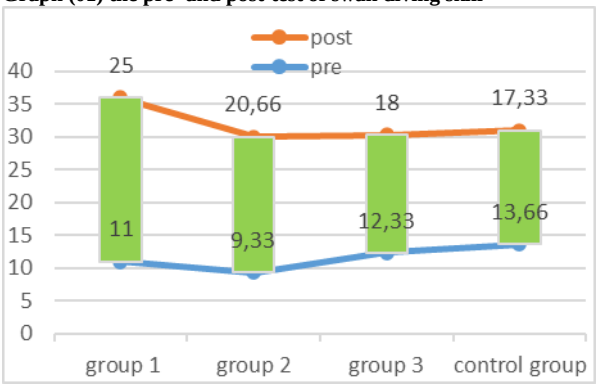
Table .4 Post Hoc test to compare the level of the groups in the post-test of swan diving skill

Test	Group (I)	Groups (J)	Mean difference (I-J)	Sig	A	decision
Post	Experimental group 1	Experimental group 2	4,33	0,11	0,05	Not significant
		Experimental group 3	7	0,01		significant
		Control Group	7,66	0,007		significant
	Experimental group 2	Experimental group 3	2,66	0,42		Not significant
		Control Group	3,33	0,25		Not significant
	Experimental group 3	Control Group	0,66	0,97		Not significant

According to Table 4 by comparing the level of the groups in terms of the results of the post-test of the swan diving skill test, we found that there are statistically significant differences between the level of Experimental group 1 and Experimental group 3 (0,01) and then between Experimental group 1 and the

control group (0,007) in terms of the results of the post test of the swan diving skill test at the level of significance 0.05 and in favor of the Experimental group1 (graph 1), while we did not record any statistically significant differences between the level of Experimental group 2 and the rest of the groups in terms of the results of the post-test of the swan diving skill test.

Graph (01) the pre- and post-test of swan diving skill



4.Discussion

Virtual simulation and network technology expands sports training and facilitates resource sharing. This can promote the 'three selves', self-learning, self-analysis and self-training (Yang 2014). This study is a comparative investigation of four different learning methods. The first one is Self-detection of the error by watching the video replay of the self-performance. The second one is Self-detection of the error by watching the self-performance video replay + watching the ideal model video. The third one is Self-detection of the error by watching the ideal model video. The last one is traditional method of error detection by teacher's instructions.

Obviously, the most important finding of this investigation is the benefit of the technological method for self-correction of errors using the Kinovea software to watch the video replay of the self-performance or to watch the ideal model video, contributes to developing the performance of the swan diving skill in

volleyball, which allows a better improvement in the technical learning.

Self-controlled (SC) video information provides great educational benefits without providing any explanations (Aiken, Fairbrother et al. 2012), for example, research on self-control has shown that learners prefer to receive feedback following more successful performance trials than unsuccessful performance trials, so one can expect that observing the video enabled them to decide the changes in performance needed to improve the routine. (Ste-Marie, Vertes et al. 2011)

For instance, it is important for educators and coaches to integrate video learning activities in sports training programs to give learners the chances to improve the specific awareness through video modeling (Amri-Dardari, Mkaouer et al. 2020). Video of body language are a suitable tool for evaluating motor performance. It is also a methodology of analysis that helps to identify the most common errors and their correction. Improved self-evaluation and self-correction skills by the children, acquiring the movement to imagine an external observation point in a dynamic form (Napolitano 2018).

In our physical education class, players can become better observers of movement and understand the theories and concepts of movement, they will develop better skills (Feher and Kaplan 2011), contrary to what was brought by the study of (Arbabi and Sarabandi 2016), which confirmed that sports skills training leads to sustainable learning through video combined modeling with verbal feedback.

As for the method of watching the self-performance video replay + watching the ideal model video at the same time using the Kinovea software, no statistically significant differences were recorded, the positive effects of video analysis may take some time to develop, as it is actually an effective method (Guadagnoli, Holcomb et al. 2002), because it needs more time than its predecessors so that players can benefit from the merging comparison, and for the traditional method of error detection by teacher's instructions, no statistically significant differences were recorded, 95% of physical education trainees

indicated that they were able to use video within their placement schools (Palao, Hastie et al. 2015), because the deep learning with a video feedback is better than verbal feedback in teaching/learning hurdle clearance (Amara, Mkaouer et al. 2015). The simplification of visual information that allows the observer to identify the more key elements that would guide him/her for the subsequent performance of the task. So, it seems that the video presentation is more effective than the live presentation (Lhuisset and Margnes 2015). Nowadays, the learning materials supported by sounds, images, and animations were observed to be more durable, fun and effective, with learning outcomes from seeing 83%, hearing 11%, smelling in 35%, touching 1.5% and tasting in 1%, the result of this study indicate that there was a significant improvement on Passing, Service and Spiking skills in volleyball among Physical Education students due to visual feedback (Durai 2016).

In fact, observation of motor skills not only leads to perceptual representation of skills, but also the players usess these perceptions later as a backing to assist in performance (Arbabi and Sarabandi 2016).

Finally, our study found that the technological method for self-correction of errors by watching a replay of the self-performance video is better than the rest of the technological methods. Self-modeling (replay of the self-performance video) enhances students' ability to realistically assess their performance and develop their skills. (Winfrey and Weeks 1993), self-modeling is advantageous, because it leads to interventions to decide on the action required to improve performance in next Attempt. (Arbabi and Sarabandi 2016), and this is what came in contrast to (Arbabi and Sarabandi 2016) study, which confirmed the advantage of the method of combining watch the video replay of the self-performance with watch the ideal model video, which is the ideal method in all cases, students assigned to the video feedback have reported a greater enhancement in comparison

with students assigned to the other methods, particularly video feedback with modeling (Amri-Dardari, Mkaouer et al. 2020).

5.Conclusion

The following conclusions were drawn from the present study.

1. There was a significant improvement on swan diving skill due to the effect of Self-detection of the error by watching the video replay of the self-performance on volleyball skills among school team players.
2. There was a significant improvement on swan diving skill due to the effect of Self-detection of the error by watching the ideal model video on volleyball skills among school team players.
3. that the technological method for self-correction of errors by watching a replay of the self-performance video is better than the rest of the technological methods in developing the swan diving skill among school team players.

The outcome of our study gives the ample evidence that ICT plays a key role in teaching technical skills for school team players and demonstrated the benefits of using kinovea in physical education when integrated into a pedagogical approach. It may therefore be helpful to use and develop this methodology extrinsic-visual feedback given through the use of video analysis of motor gestures specific to Volleyball.

In the meantime, we need to examine ways in which we can help students to use technology in ways that rely less on teacher intervention. And there is still reason to examine the psychological influences of positive affect and its impact on motor skill learning in the context of self-modeling benefits.

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