

The Effectiveness of Zumba Exercises Training on the Physical and Health Course Outputs among University Students

Mona Soleiman^{1,*}, Ahmed Mahmoud Elkilany¹, Hager Al-Sayed², Reda Abdelsalam¹

¹Department of Self-Development, Preparatory Year & Supporting Studies, Imam Abdulrahman Bin Faisal University, Saudi Arabia

²Faculty of Science and Humanities, Imam Abdulrahman Bin Faisal University, Saudi Arabia

Received December 27, 2020; Revised February 20, 2021; Accepted March 12, 2021

Cite This Paper in the following Citation Styles

(a): [1] Mona Soleiman, Ahmed Mahmoud Elkilany, Hager Al-Sayed, Reda Abdelsalam, "The Effectiveness of Zumba Exercises Training on the Physical and Health Course Outputs among University Students," *International Journal of Human Movement and Sports Sciences*, Vol. 9, No. 2, pp. 316 - 323, 2021. DOI: 10.13189/saj.2021.090220.

(b): Mona Suleiman, Ahmed Mahmoud Elkilany, Hager Al-Sayed, Reda Abdelsalam (2021). *The Effectiveness of Zumba Exercises Training on the Physical and Health Course Outputs among University Students*. *International Journal of Human Movement and Sports Sciences*, 9(2), 316 - 323. DOI: 10.13189/saj.2021.090220.

Copyright©2021 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

Abstract Recently, Zumba practices were introduced to enhance the physical and social outcomes of the students. This study ascertains the effectiveness of Zumba exercises (individual- collective) on the physical outputs sought by the physical and health education course offered at the preparatory year for the university students. The current study employs a quasi-experimental pre-post-test design. Students were divided into two groups, one experimental and the other control. The potential participants included around 1040 students from the science track who took the course during the first semester of the 2019-2020 academic year. The research sample was selected using the specific selection method which reached 60 students; 30 for each group. Zumba group exercises were employed in the warm-up part and as homework for the experimental group, and the method followed at college was employed by the controlled group. Some fitness tests were used to measure the factors of speed, muscle strength, agility and periodic respiratory endurance. From the results, the experimental group attained higher mean scores than students in control group. The study concluded that Zumba exercises are very effective in the teaching and learning process of physical education courses.

Keywords Zumba, Exercises, University, Students, Physical Education

1. Introduction

Exercising is an important aspect of the lives of individuals and their physical, physiological and cognitive needs [1, 2]. The benefits of sport are many and known to everyone, especially in light of the psychological or physical pressures that a person is exposed to in order to face the requirements of life in general. As stated in the WHO Global Action Plan for Disease Prevention, lack of physical activity is a major risk factor for disease, and physical activity is decreasing in many countries. Globally, 23% of adults and 81% of adolescents of school and university age are not sufficiently active. Encouraging people to exercise more is one of the key strategies for reducing the spread of non-communicable diseases and combating them 2013-2020. The plan calls for a 10% reduction in this lack of physical activity by 2025, which will also contribute to achieving the goals for sustainable development. Kraus et al. [3] evidenced the benefits of regular sport practice in enhancing quality of practitioners' life, education, public and their healthcare.

In view of the recent trend in the educational process, the learner has the right in obtaining the experience provided by the educational situation, which shifts the focus of attention from the teacher to the learner, where the latter will stand positively and actively in achieving the required educational objectives [4]. Therefore,

employing practical homework was suggested as a method to exploit the time of students outside the classroom and to make up for the shortage of lecture time, as well as help raise the fitness level of the students. The homework was defined as any task assigned to the learner by the teacher and performed outside the classroom taking into account that it has a specific goal and that the level of the duty is appropriate and not exaggerated so that it does not have a reverse effect [5]. It must also be characterized by considering the abilities of learners so that learners can perform it independently [5].

Zumba is one of the most popular and fast-growing types of exercise in the world, and it started becoming popular in the Arab world also. It is a Colombian fitness program created by Beto Perez, based on Latin dance movements, such as Samba, Salsa, Cambia, Tango, Flamingo and oriental dance; it is a collection of dances with each dance designed to the rhythms of Latin melodies [6]. The researchers found that the introduction of kinetic exercise (Zumba)- with its interrelated motor rhythm and the auditory aspect in the warm-up part, together with the use of the screens in the classroom hall to display the exercises- invites the student to move, interact more and relate to performance at home as a motor duty. Zumba combines many easy-to-apply sports steps that help you move a large number of your body muscles, such as arms, back, feet and torso. It belongs to aerobic exercises (or aerial exercises), i.e. it burns a lot of calories [7]. Zumba exercises help stimulate the heart and lungs, increase overall fitness and make circulation move faster. Besides, they increase the amount of oxygen sent to the muscles and other body organs [8, 9].

Bakhit stated that Zumba does not follow traditional training methods; it uses all the basic fitness elements, and during the training module, it employs physical strength, and all parts of the body are moved from head to toe. With Latin moves, the body uses essential muscles and works to harmonize them [6], [10]. Therefore, Zumba is quite important to students because regular Zumba practices affect psychological and social outcomes, reducing weight and improves strength of movement and blood flow to the muscles [8, 9]. Zumba positively affects the development of attributes and skills, the level of muscle strength, respiratory endurance, and weight management [11, 12]. Some studies, [8] observed that that motor exercise program accompanied with music (Zumba) has positively contributed to weight loss. Ref [9] indicated that Zumba positively effects psychological and social outcomes. In the study carried out by [13], higher scores were found on the several physical elements (periodic respiratory endurance, motor balance, flexibility, strength of legs and neuromuscular compatibility) for students who participated in Zumba exercises compared with students who did not participate.

Although, previous studies highlighted the importance

of Zumba exercises and its effectiveness on students' skills and abilities, the research is still insufficient to fully understand and less is known about Zumba and learning outcomes at the university's settings in general and in Arab world in particular. Considering these shortcomings, this study was designed to investigate the effect of Zumba exercises (individual - group) on the physical outputs of the Physical and Health Education course for preparatory year students.

Research Hypotheses

There are no statistically significant differences between the averages of the pre- and post- measurements of the experimental and control groups in favor of the post-measurement in the physical outputs of the Physical and Health Education course for the preparatory year students.

2. Methods

Settings

The study was conducted in Dammam, Eastern Region in Saudi Arabia during four weeks in the first term from 1 to 25 September 2019. The researchers touched on the importance of the community they work in, which is the university community and the extent of the impact that their work can have to improve the health of female students and get them used to practicing sports, not only according to the curriculum, which is given once a week, but to try to increase that number. The physical and health education course was introduced to the preparatory year courses of Imam Abdul Rahman bin Faisal University in 2012 as an educational course for female students. It is the first university in the Kingdom where this course is taught with a practical part, and its goal is to raise the level of fitness for female students, which is a precedent giving credit for Imam Abdul Rahman bin Faisal University and then other universities have followed their steps, therefore, the rationale for the present study.

Design

Quasi-experimental pre-posttest design was implemented in this study. The design was employed to investigate the effect of Zumba exercises (individual - group) on the physical outputs of the Physical and Health Education course for preparatory year students.

Sample and Procedures of the Study

The research community included all the 1,040 female students of the preparatory year, Science track, in Imam Abdul Rahman bin Faisal University, for the academic

year (2019-2020). The research sample was selected using the specific selection method, and it included (60) female students, divided into two equal groups: one controlled and the other experimental from the preparatory year, science track. Furthermore, the sample was from one college because of their acceptance, availability to the researchers as well as quality of the instructors. Collective Zumba exercises were added in the warm-up part of the lecture and were taken as a homework for 3 times per week. More details on the lesson content and related homework's are presented in table 1 and 2 below. Twenty-five students were chosen to participate in the pilot study whereas students who exercised outside of the university (as in ladies' gyms) were excluded, together with students who have medical excuses preventing them from practicing sports with a medical excuse approved by the university administration, whose number reached 5 students.

Instruments

Several measurement tools were used in this study for data collection in order to achieve the study purpose. The researchers relied on tests developed by the department to measure the level of physical performance of female students. Validation of the measures was done by professionals and academics in physical education, measurement and evaluation. Tools for measurement included in this study are: a measurement bar to measure the length in centimeters; a scale to measure weight in kilograms, a stopwatch to measure time per second, a flexible gauge in centimeters, a computer connected to the internet and a smart board for display; Physical tests such as a test of wide jump of stability to measure legs muscular ability, a test of standing after lying to measure the strength of the abdominal muscles, a shuttle running test 10m in 30 seconds to measure speed, a test of numbered circuits to measure agility.

Table 1. Time Frame of Lessons Content

Content	Time	Part
10 Mins Zumba Exercise	10 mins	Introductory Part
1- Explain and clarify the individual exercises written in the standard sheet for each week 2. Get training on the exercise 3- Review the performance of female students for exercises, check their implementation of the exercises (mentioned in the standard paper) at home, and follow up on their progress	40 mins	Main Part
Exercises for calming Distribution of new standard paper to female students	10 mins	final Part

Table 2. Time Distribution of the Content of the Homework

Distribution of Assignment Time Per Week	Experimental group Zumba Exercises inside the Lecture in the Warm-up Part and at Home.			
	Total Duty Time	Time Frame of Duty	Number of Assignments per Week	Week
46 M	23 M	8s Zumba + 15 s individual exercises	2	1
46 M	23 M	8s Zumba + 15 s individual exercises	2	2
56 M	28 M	8s Zumba + 20 s individual exercises	2	3
84 M	28 M	8s Zumba + 20 s individual exercises	3	4
108 M	36 M	16s Zumba + 20 s individual exercises	3	5
108 M	36 M	16s Zumba + 20 s individual exercises	3	6
108 M	36 M	16s Zumba + 20 s individual exercises	3	7
144 M	36 M	16s Zumba + 20 s individual exercises	4	8
144 M	36 M	16s Zumba + 20 s individual exercises	4	9
144 M	36 M	16s Zumba + 20 s individual exercises	4	10
988s	Total time of Zumba Exercises at Home (Duty)			

Table 3. Average, Standard and Intermediate Deviation, Deviation Factors of Growth Rates, Basic Variables and Physical Tests of the Two Experimental Research Groups (N = 60)

Deviation Factors	Standard Deviation	Arithmetic Average	Measurement Unit of	Variables
0.685	0.43	18.544	Year	Age
0.529	7.092	160.07	cm	Height
0.553	10.98	58.45	Kg	Weight
-0.51	1.3172	7.2	Number	Shuttle Run 10m
-0.001	14.88	84.37	cm	Wide Jump of Stability
0.157	2.155	8.77	Number	Stand after Lying
0.22	1.892547	6.76	Seconds	Jump in Numbered Circles

Table 4. Indication of Differences between the Controlled and Experimental Groups in the Basic Variables and Physical Tests

Calculated "T" Value	Experimental Group		Controlled Group		Unit of Measurement	Variables
	d	a	d	a		
0.684	0.399	18.57	0.46	18.521	Year	Age
0.24	8.19	158.97	5.988975	161.17	cm	Height
0.167	10.19	56.47	11.87	60.43	kg	Weight
0.176	1.22	6.97	1.412	7.43	No.	Shuttle Run 10m
0.334	17.62	86.23	11.43	82.50	cm	Wide Jump of Stability
0.557	2.56	8.6	1.72	8.93	No.	Stand after lying
0.301	2.098	7.017	1.73	6.50	Seconds	Jump in Numbered Circles

value at level (0.05) = 2.05

3. Results

Homogeneity of variance for the research sample was performed in the basic variables (age- length- weight) and the physical tests under research as shown in table 3. It is clear from table (3) that all deviation factors for growth rates, physical tests and motor satisfaction of the research sample are limited to (± 3), indicating moderation of values and homogeneity of research sample. Furthermore, equality between the two groups was achieved as far as the variables of age, height, weight, physical tests (under study), and motor satisfaction are concerned as illustrated in Table 4. Table (4) shows that there are no statistically significant differences between the averages of the pre-measurements of the two groups (controlled and experimental) as far as the basic variables and physical tests (in question) are concerned, as the calculated (T) value is lower than the table (T) value at the level (0.05), indicating equality between the two groups in these variables. In regard to organizing educational experiences is achieved through the time frame of the content of the educational unit. The researchers designed a standard paper for the student's motor homework, with explanation of the exercises with pictures for clarification, together

with the time and number of implementations per week. This paper was presented to (3) professors in the field of curriculum and teaching methods to take their opinion about its content, with a (100%) acceptance from all.

Regarding to the hypotheses testing, it is clear from table 5 that there are statistically significant differences between the average of both the pre- and post-measurements for the controlled group in the physical tests in question. These differences are in favor of the post-measurement, as the calculated (t) value is greater than the table (t) value at the level (0.05). Table (6) also showed that there are statistically significant differences between the average of both the pre- and post-measurements for the experimental group in the physical tests in question and motor satisfaction, in favor of post-measurement, as the calculated (t) value is greater than the table (t) value at the level (0.05). Finally, table (7) presented that there are statistically significant differences between the averages of the post-measurements for both the controlled and experimental groups in the physical tests in question and motor satisfaction, in favor of the experimental group, since the calculated (T) value is greater than the table (T) value at level (0.05).

Table 5. Indication of Differences between the Average of both the Pre- and Post-Measurements for the Controlled Group in the Physical Tests

Calculated "T" Value	Post-Measurement		Pre-Measurement		Unit of Measurement	Variables
	d	a	d	a		
5.36	1.15	9.43	1.46	7.53	No.	Shuttle Run 10m
2.9	18.30	115.5	10.67	84.17	cm	Wide Jump of Stability
8.98	2.34	13.6	1.77	9.1	No.	Stand after Lying
6.30	1.18	4.38	1.73	6.50	Seconds	Jump in Numbered Circles

Table value (t) at (0.05) = 2.14

Table 6. Indication of Differences between the Average of both the Pre- and Post-Measurements for the Experimental Group in the Physical Tests

Calculated "T" Value	Post-Measurement		Pre-Measurement		Unit of Measurement	Variables
	d	a	d	a		
3.07	0.95	10.5	1.21	6.97	No.	Shuttle Run 10m
2.95	21.54	137.76	17.89	86.23	cm	Wide Jump of Stability
2.66	3.39	17	2.57	8.6	No.	Stand after Lying
3.26	0.65	2.99	2	7.05	Seconds	Jump in Numbered Circles

Table value (t) at (0.05) = 2.14

Table 7. Indication of Differences between the Averages of the Post-Measurements for both the Controlled and Experimental Groups in the Physical Tests

Calculated "T" Value	Experimental Group		Controlled Group		Unit of Measurement	Variables
	d	a	d	a		
9.14	0.95	10.5	1.15	9.43	No.	Shuttle Run 10m
3.76	21.54	137.76	18.30	115.5	cm	Wide Jump of Stability
2.67	3.39	17	2.34	13.6	No.	Stand after Lying
2.29	0.65	2.99	1.18	4.38	seconds	Jump in Numbered Circles

Table (T) value at (0.05) = 2.05

4. Discussion

The results of this study indicated that there are statistically significant differences between the average of both the pre- and post-measurements for the controlled group in the physical tests in question. These differences are in favor of the post-measurement, as the calculated (T) value is greater than the table (T) value at the level (0.05). This indicates that the combinations of the teaching styles and the training activities positively enhanced the level of fitness elements among students. The researchers also attribute this improvement to the fact that the exercises are new for the students. Monitoring learners during the performance and giving feedback to them at the same time have led to the ease of students' understanding and learning of the exercises, which undoubtedly provided a good opportunity for improvement which positively affects the level of physical performance.

This is in consistent with the results of the studies conducted by [10, 11, 12, 14], who confirmed that the use of the explanation method and the performance of the model have a positive impact on the performance of learners. Thus, the second hypothesis, which states that there are statistically significant differences between the averages of both the pre- and post-measurements for the controlled group in favor of the post-measurement at the level of some fitness elements, is achieved. It is clear from table (6) that there are statistically significant differences between the average of both the pre- and post-measurements for the experimental group which employs motor duty (some Zumba exercises) as homework in the physical tests in question. These differences are in favor of post-measurement, as the calculated (T) value is greater than the table (T) value at the level (0.05). The researchers attribute this improvement to the use of Zumba exercises at the time of

warm-up during the lecture, which combines sports movements and dance movements, besides the presence of interesting music. All these have worked to attract students' attention and arise their desire to practice. This method (giving motor duty as homework) used a collection of dynamic exercises, which is Zumba, and the teacher monitored performance through the standard paper given to the student to be used at home and delivered again to the teacher each lecture to find out whether the performed duty had a positive effect or no. These exercises took into account the individual differences of the students and made the same weak student not shy from the performance, especially at the beginning, training at home according to her level and thus improving her performance due to the student's internal desire to train. All of this provides a good opportunity to learn and increase motivation to gain knowledge, which positively affects the efficiency of physical performance, increases excitement, and dispels boredom. Moreover, the student's progress in her motor level enhances her sense of self-satisfaction and mobility abilities, which in turn increases her self-confidence.

This is in consistent with the results of studies done by [10, 11, 12, 14], who confirmed that the use of motor duties had a positive impact on the level of motor performance of learners. Thus, the second hypothesis, which states that there are statistically significant differences between the averages of both the pre- and post-measurements for the experimental group in favor of the post-measurement at the level of some fitness elements, is achieved. It is clear from table (7) that there are statistically significant differences between the averages of the post-measurements for both the controlled and experimental groups at the level of some fitness elements, in favor of the experimental group, since the calculated (T) value is greater than the table (T) value at level (0.05). The researchers observed that the improvement achieved by the experimental group if compared to the controlled group was due to the multiplicity of sources employed for the educational material. This is because the students in the controlled group got the content of the exercises through presentation and enacting by the teacher within the lecture, and the role of the student is limited to receiving and implementing according to the order and timing of the teacher, but the experimental group got an additional part which is some Zumba exercises. Moreover, the motor homework, for which the teacher allocates 3 times a week other than the basic lecture, provided a great opportunity for the student to train and improve her level. This result is in line with [6] and [8] as they mentioned that practicing Zumba exercises helps to activate the heart and lungs, increases general fitness and makes the circulation move faster, in addition to increasing the amount of oxygen that is pumped through the muscles and the rest of the internal body organs.

[6] confirm through their study that Zumba exercises do not follow traditional training methods; Zumba uses all basic fitness elements, and during the training unit, it uses a lot of the person's physical strength, and all parts of the body are moved from head to toe. With these movements, the body uses a lot of essential muscles and works to harmonize them. The researchers also suggested that the improvement of the student's level can be attributed to the effectiveness of the motor duty and its consideration of the psychological state of students who feel ashamed and afraid of criticism. Also, the teacher's follow-up of her students in terms of their implementation of the exercises, addressing the problems they faced and correcting what they stumbled upon in doing at home if there is, besides the commitment of the students to carry out the duty periodically as they are accustomed to, all this help improve the level of their physical and motor fitness and thus increase their self-confidence. This is in line with what [15], who indicated as he mentioned that asking students to do homework, following-up on them, providing evidence of implementation of the duty, and asking them about it, all this makes the student feel the importance of the subject and the importance of the duty; besides, the teacher stands on the extent of the learner's absorption of the educated subject. He also noted that those who are constantly familiar with homework are characterized by a high level of activity and confidence in discussing the scientific subject in an effective manner.

In addition, choosing Zumba besides individual exercises helped to keep the ghost of boredom away from the students when performing as Zumba is one of the aerobic exercises that is characterized by fun, excitement and activity in its performance, as well as speed of movement on the rhythm of music mixed from different nations. Even if music is not used, the form of the movements and their consecutiveness helps keep their order and thus continue to perform them until they get memorized and then performed continuously as a free skill and hobby even outside the framework of the course. All this enhances the student's confidence in her abilities and her satisfaction with both movement and self in general, hence, achieving what the course seeks and what is mentioned in Lars Donath's study. This is in consistent with what [16], who said that modern dance is one of the means that contributes significantly and unlimitedly to the development of the mental abilities of the individual, especially the abilities of innovative thinking, imagination, attention and focus, and it also affects motivation and academic performance, and develops the individual's self-esteem, sense of responsibility, cooperation, gratitude and the urgent and continuous desire to work hard. Moreover, it increases and develops the qualities of commitment and respect of others, as modern dance works to treat shyness in the classroom, build self-confidence and develop the students' sense of happiness and psychological satisfaction. It also helps to

develop social attitudes and social interaction. This is in consistent with the studies of [13, 17], where their results agreed on the usefulness of both domestic motor duties and Zumba as aerobic exercises in improving the level of physical performance of its practitioners. This is in line with [5], statement that homework has a positive impact on educational achievement. Thus, the third hypothesis, which states that there are statistically significant differences between the averages of the post-measurements for both the controlled and experimental groups in favor of the experimental group at the level of some of the fitness elements in question, is achieved.

5. Conclusions

In summary, the study showed that training activities combined with Zumba exercises are important in enhancing females' student's physical performance. The use of homework employing coherent motor exercises (Zumba) has improved the level of some of the fitness elements of the students of the experimental group. Finally, Zumba exercises contributed to the addition of an atmosphere of fun and pleasure and the elimination of shyness among students and between them and faculty members, a fact that contributed to increasing the desire of the students to train and to approach the lecture enthusiastically.

6. Limitations and Recommendations

The study has some limitations such as other studies. First, although, the study achieves positive result, the study was conducted in a short period, therefore, future studies should extend the study period. Additionally, the study was conducted in one university in the Eastern Region of Saudi Arabia, and future studies should be conducted in other universities to validate the study results. Another limitation is that the study was based on quantitative method, and future study, therefore, should use other method such as qualitative or mix method to validate the result of the current study. Finally, there is a need to use other exercises and modern techniques and compare them with the currently used ones in order to identify the best methods that lead to the development of physical performance.

REFERENCES

- [1] Alper Kartal, Esin Ergin, "Investigation of the Effect of 6-week Yoga Exercises on Balance, Flexibility, and Strength in Soccer Players," *International Journal of Human*

Movement and Sports Sciences, Vol. 8, No. 3, pp. 91 - 96, 2020. DOI: 10.13189/saj.2020.080303.

- [2] Said Lotfi, Imane Elmoutaraji, Mohammed Talbi, "Effect of Physical Exercise and Gender on Information Processing and Choice Reaction Time of University Students," *International Journal of Human Movement and Sports Sciences*, Vol. 8, No. 1, pp. 37 - 42, 2020. DOI: 10.13189/saj.2020.080105.
- [3] Kraus, W. et al. "The national physical activity plan: A call to action from the American heart association". *Circulation*, vol. 131, no. 21, 2015. <http://doi.org/10.1161/CIR.000000000000203>.
- [4] K, Nabil. "The impact of using the two methods of 'application by peer guidance' and 'self-application' on some physical and skill components for beginner players in handball". Unpublished Doctoral Dissertation, University of Suez Canal, 6, 2001.
- [5] J, Abdel-Hamid. "Teaching art, acience and construction". *Darelfikrelarabi*, vol. 88, no. 96, 2013.
- [6] <https://prezi.com/ggg3gnisb4hl/to-study-the-effect-of-12-weeks-of-zumba-fitness-workout>. (accessed Jan. 13, 2019).
- [7] S, Jairam. "The effects of a 12-week Zumba fitness workout and diet modifications on weight loss, fat loss, other fitness parameters and stress among women in the age group of 25-45 years in Mumbai city", 2013.
- [8] R, Bakhit. "Impact of a proposed training program using motor exercises with music (Zumba) for women's weight loss in omdurman locality". Unpublished Master Thesis, Sudan University of Science and Technology, 123, 2017.
- [9] P, Domene P. J, Hannah. E, Pummell. C, Easton. "Salsa dance and Zumba fitness: acute responses during community-based classes". *Journal of Sport and Health Science*, vol. 5, no. 2, pp. 190-196, 2016. <http://doi.org/10.1016/j.jshs.2015.04.004>.
- [10] Mohammed, T. "The effect of using multi-form motor duties on learning some offensive skills in handball for students of the faculty of physical education". Unpublished Master Thesis, Mansoura University. 2006.
- [11] Salem, A. "The impact of additional physical duties on the development of some of the physical qualities of some different sports centers for football players under 15". Unpublished Master Thesis, University of Benha. 2012.
- [12] A, Qutb. "The impact of an educational program with keller's strategy using motor duties to teach athletics skills for female students of the second year of basic education". *Magazine of Theories and Applications*, vol. 1, no. 78, 2013.
- [13] K, Hiznayora. "Exercise intensity during Zumba fitness and Tae-Bo aerobics." *International Christmas Sport Scientific Conference*. *Journal of Human Sport & Exercise*, vol. 8, no. 2, pp. 228-241, 2013. DOI:10.4100/jhse.2012.8.Proc2.26.
- [14] I, Donath. R, Roth. Y, Hohn. L, Zahner. O, Faude. "The effects of Zumba training on cardiovascular and neuromuscular function in female college students". *European Journal of Sport Science*, vol. 14, no. 6, pp. 569-577, 2014. DOI: 10.1080/17461391.2013.886168.
- [15] <https://doi-org.library.iau.edu.sa/10.1080/17461391.2013.866168>. (accessed Feb. 7, 2019).

- [16] Rashid, A. "The impact of the use of motor duties on behavioral interaction between teachers and pupils in the physical education course in fifth primary". Unpublished Master Thesis, Mansoura University. 2006.
- [17] Al-Sharhan, J. "The guide in teaching methods". King Fahad National Library, 85, 2003
- [18] Hamdi, M. "Innovative design art, Anglo Library". Helwan University, Cairo, 13. 2007.
- [19] Y, Koutedakis. H, Hukam. G, Metsios. A, Nevill. G, Giakas. A, Jamurtas. L, Myszkewycz. "The effects of three months of aerobic and strength training on selected performance and fitness-related parameters in modern dance students". *Journal of Strength and Conditioning Research*, vol. 21, no. 3, pp. 808–812, 2007. DOI: 10.1519/R-20856.1.
- [20] <https://doi-org.library.iau.edu.sa/10.1080/17461391.2013.866168>. (accessed June 1, 2020).
- [21] <https://www.who.int/teams/health-promotion/physical-activity/physical-activity-and-young-people>. (accessed June. 3, 2019).