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Effectiveness of Jump Rope Exercise to Improve Cardio-Vascular Endurance of Special Program in Sports (SPS) Students

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Abstract

Physical activity is really an important ingredient of a healthy lifestyle. Thus, schools must initiate programs, establish projects and activities (PPA's) related to the improvement of the holistic development of the learners in schools.

This study sought to investigate the effectiveness of jump rope exercise to improve cardiovascular endurance of Special Program in Sports (SPS) students of Zambales National High School, Iba, Zambales. The study utilized a quasi-experimental one-group pretest and posttest design involving eight (8) SPS students for Tennis during the school year 2022-2023.

The summary of the investigations concluded that 8 or 100.00 percent of the participants belonged to Needs Improvement Zone (I) in the assessment of their cardiovascular endurance as measured of their Jump Rope exercise as reflected in the pre-assessment mean of 27.38; and also revealed that 5 or 62.50 percent belonged to Health Fitness Zone (F), while 3 or 37.50 percent were belonged to Needs Improvement Zone (I) in the assessment of their cardiovascular endurance as measured of their Jump Rope exercise as reflected in the post-assessment mean of 37.41;

there is a significant difference in the students' physical fitness performance in the experimental group before and after the treatment as reflected in the t-value of 0.0168 which is less than the 0.05 alpha level of significance. Likewise, the SPS students as experimental group in the study yielded a 10.04 gain score, implying its effectiveness; and the fitness plan for SPS students appears to be a comprehensive and well-structured approach to enhance their cardiovascular endurance using jump rope exercises and assessed using PACER test.

The researcher recommends that Physical Education teachers may include jump rope as fitness exercise before the start of the practical lessons as intervention to improve the cardiovascular endurance; mass rope jumping activity shall be presented during "Field Day" and/or opening and closing program of provincial and regional athletic meets as field exhibition; the use of Jump Rope exercise and PACER test may be replicate to the district and schools division levels; and parallel study may be conducted to validate the effectiveness of the jump rope exercise to improve cardiovascular endurance to non-SPS students.

Keywords: Jump Rope Exercise, PACER Test, Physical Fitness, SPS Students, ZNHS

Rationale

Proper exercise is really an important ingredient towards the goal of maintaining physically fit and active lifestyle as student-athletes especially when enrolled in the Special Program in Sports (SPS) class. Students with a healthy mind, active body and strong cardiovascular endurance are important factors in lowering cholesterol, blood pressure and resting heart rate that all contributed to a healthier heart (*Andrea Metcalf Inc*).

Teaching holistic approach in physical education to attain an improved cardio-vascular endurance is a must and should be regularly supervised by SPS specialized teachers. Thus, it is necessary to conduct regular and proper physical activities by trained teachers in school, (*DepEd Order 54, s. 1994*).

Various health agencies recommend regular physical activity as a strategy to improve the overall health and wellness such walking, jogging, biking, cycling, running, jump rope activities and Zumba dance exercise and many more with strict implementation of health and safety protocols. According to *Pate, Oria, Pillsbury (2012)* ^[13], conducting fitness tests in schools and other educational settings may result in benefits for both individuals and groups beyond improving fitness. Thus,

World Health Organizations (WHO) recommends sixty minutes of physical activity a day. That is all it takes for students to obtain lifelong health benefits, (*FITNESSGRAM Mini Brochure, 2013*) and the importance of their health and fitness in this time of health crisis should be prioritized. Starting to exercise as an adult may be too late. *Raley & Hagerman (2008)* as mentioned by *Brusseau & Hannon (2015)* noted that physical inactive children are likely more overweight, miss school and perform worst academically. Physical inactivity is associated with numerous health risks, including heart disease, cancer, diabetes, hypertension, as well as anxiety and depression (*Kohl & Cook, 2013*)^[9]. On the other hand, medical evidence shows that the earliest bodily changes leading to heart diseases begin early in life. Cardio-respiratory diseases claim many lives every year. Developing healthy lifestyle patterns early in life will prevent/minimize cardio-respiratory diseases, (*DO 54, s. 1994*). In today's generation, developing the 21st century learners require not only the enhancement of their cognitive and affective domain but also their psychomotor aspect. Hence, enhancing students' physical fitness should be magnified in the physical education curriculum. It is also anchored to the ultimate collective of the department's physical education program to develop physically fit and healthy school children and youth, (*DO 54, s. 1994*).

With this, the researcher, as a Physical Education teacher became motivated in conducting a study which determined specific tasks that develops cardiovascular endurance of the students. It will determine whether jogging and rope jumping can be an effective exercise to improve the cardiovascular endurance of the students. Findings may be utilized by Physical Education teachers in the development of their fitness exercise plans for their students. Furthermore, low physical fitness assessment and performance of SPS students in trainings and competitions, occurring competition burn-out, no regular physical fitness assessments of students, lack of physical and mental conditioning, decrease of fitness motivation, frequent injuries, relevant stress, and anxieties are some of the problems encountered by teachers that hinder student-athletes to do their best in athletic competitions. Moreover, these also hamper teachers in guiding SPS students to improve and master their respective skills in various sports events. These research gaps drive the researcher to investigate the effectiveness of jump rope exercise to improve cardiovascular endurance among Special Program in Sports (SPS) students of Zambales National High School, this school year 2022-2023.

Statement of the Problem

This study aimed to investigate the effectiveness of jump rope exercise to improve cardiovascular endurance of Special Program in Sports (SPS) students of Zambales National High School, this school year 2022-2023. Specifically, this study sought answers the following questions:

1. What level of cardiovascular endurance do the SPS students have before the jump rope exercise?
2. What level of cardiovascular endurance do the SPS students have after the jump rope exercise?
3. Is there a significant difference in the cardiovascular of the SPS students before and after the jump rope exercise?
4. What implications can be drawn based from the salient

findings of the study?

Hypotheses

Based on the specific problems of the study, the following hypotheses are posited:

Null Hypothesis (*H₀*): The use of a jump rope exercise has no significant effect to improve students' cardiovascular endurance of Special Program in Sports (SPS) students.

Alternative Hypothesis (*H_a*): The use of a jump rope exercise has a significant effect to improve students' cardiovascular endurance of Special Program in Sports (SPS) students.

Significance of the Study

The purpose of this study was to investigate the effectiveness of jump rope exercise to improve the cardiovascular endurance of Special Program in Sports (SPS) students of Zambales National High School, this school year 2022-2023.

The findings of this study are beneficial to the following entities:

Department of Education: DepEd may use the findings of this study to intensify the existing programs for students' physical education and physical fitness in order to holistically improve the physical conditions of the students through providing quality instructions, innovations and relevant programs for physical education, fitness and wellness in order the students to become a critical thinker of the society.

DepEd Officials: The findings of the study aid instructional managers and supervisors who are concerned in implementing the physical education, fitness, health and wellness for students in all levels.

Schools Division of Zambales: With the use of the results of the study, this elevates the performance of teachers and students in the Schools Division of Zambales in searching for new strategies on how to improve the quality of education in the public school system.

School: The findings serve as an opportunity to develop an educational innovation regarding students' fitness this time of post-pandemic years and provide solutions to the arising problems and issues concerning their health, fitness and wellness.

Special Program in Sports (SPS) Students: The findings of this study help SPS students to be equipped with necessary knowledge, skills and attitudes towards the attainment of their full potential as student-athletes competing in the local and higher level of sports competitions.

SPS/MAPEH Teachers: The findings of the study help MAPEH teachers and SPS teacher-specialists to gather research-driven data and findings that guide teachers and other school personnel to strengthen physical education and physical fitness program of students of the school.

Future Researchers: Educational researchers could draw from this study the information which may be relevant to their own areas or field of study.

Definition of Terms

To understand better the content of this study, the following terms and phrases were hereby defined conceptually and operationally.

Jump Rope Exercise: It refers to a perfect aerobic cardiovascular exercise. It warms up the body, strengthens

the muscles, increases aerobic fitness, and burns a lot of calories in a short period of time. Jumping rope can also improve speed, coordination, agility, and balance.

PACER (multistage 20m-shuttle run) stands for Progressive Aerobic Cardiovascular Endurance Run. It is a multi-stage fitness test, performed in a shuttle-run format, that helps children pace themselves effectively, and is generally regarded as more fun for younger children than the mile run because the pace can be set to music. The P.A.C.E.R. is a viable alternative to the mile run, even though both tests measure aerobic endurance, because it can be administered indoors or in a much smaller area than is needed for the mile run, (*Connecticut Physical Fitness Assessment, 2009*).

Special Program in Sports: It refers to a four-year secondary curriculum patterned after that of a regular high school, with specialization in sports. This is in line with efforts of the DepEd to institutionalize a program that will identify/ discover students with potential sports talents and train them for higher levels of athletic competitions.

Zambales National High School: It refers to a public educational institution that offers basic education programs namely: Junior high school and senior high school situated in the Municipality of Iba, the capital town of the Province of Zambales.

Type of Study

The study utilized a quasi-experimental one-group pretest and posttest design to investigate the effectiveness of jump rope exercise as tool to improve cardiovascular endurance of Special Program in Sports (SPS) students of Zambales National High School, Iba, Zambales this school year 2022-2023. In this study, the researcher examined the use of rope jumping exercise to Special Program of Sports (SPS) students and to determine whether if there will be changes in their cardiovascular endurance before and after their exposure to the exercise.

Various researchers concluded that quasi-experimental one-group pretest and posttest design is measured once before the treatment is implemented and once after it is implemented. The pretest-posttest design is much like a within-subjects experiment in which each participant is tested first under the control condition and then under the treatment condition.

Participants

The study was participated by a total of eight (8) Special Program in Sports (SPS) student-athletes for Tennis of Zambales National High School which were enrolled during school year 2022-2023.

The participants in the rope jumping exercise were provided with a 6-week exercise program which delivered 2 times a week. The researcher has upgraded the intensity of the exercise through a pre-set timer where the actual length of time of rope jumping will be gradually increased.

The SPS participants were provided with a rope jumping material with a prescribed length. The height of the rope jumping materials was three (3) feet higher than the students' height. The rope jumping technique used was the basic jump or easy jump. It was done by turning around the rope in front, both feet jump over it at the same time, moving the rope behind until it passes overhead to complete one revolution. The approximate number of revolutions per minute (rpm) is 100 to 120 times.

The participants were thoroughly oriented about the purpose

of the research, potential risks, and benefits, and they were also advised that their participation to this research was purely voluntary. The researcher has applied the principle of privacy, anonymity, and confidentiality to ensure the non-disclosure of the identity and the data gathered of and to those participating in the study.

Research protocol in the new normal education was strictly followed by the researcher who sought permission to conduct research study to the Schools Division Superintendent, school principal, class adviser, department head, learners and parents through a signed informed consent and other related documents.

Data Collection

The draft of the action research was subjected for editing for both technical and content aspects with the MAPEH Department Head, master teacher and key teachers with specialization in physical education including the School Research Manager and three (3) other colleagues. They were also asked to check and give clear suggestions to improve the research proposal up to the finalization of the research manuscript.

Upon the approval of the research proposal from Mr. Guillermo E. Mantes, Principal III, the participants of the study were required to answer the Physical Activity Readiness Questionnaire (PAR-Q) then followed by the administration of a pre-test exercise activity to establish the baseline data of the participants. The gathered results from the SPS participants were analyzed and interpreted by the researcher using a T-test to determine the level of improvement of the students on their cardio-vascular endurance.

The following are the steps in gathering data as used by De Leon (2019)^[11], to wit:

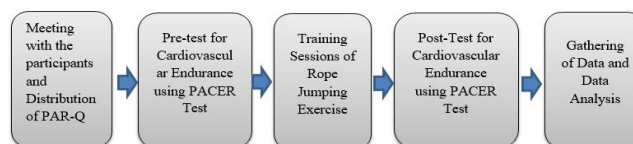


Fig 1: Steps in Gathering Data

Instruments

The following instruments were mainly used in gathering data.

PACER Test (multistage 20m-shuttle run) was known as the Progressive Aerobic Cardiovascular Endurance Run. It is a multi-stage fitness test, performed in a shuttle-run format, that helps children pace themselves effectively, and is generally regarded as more fun for younger children than the mile run because the pace can be set to music. The PACER is a viable alternative to the mile run, even though both tests measure aerobic endurance, because it can be administered indoors or in a much smaller area than is needed for the mile run.

Pre-set Timer Materials. These instruments were used to conveniently guide the participants in rope jumping exercise. With the use of laptop and LCD projector, the pre-set timer will be projected on the wall which can be seen by the participants even in the farthest area of the covered court. It shows the number of sets or rounds completed and the interval time of rest. At the same time, the audio speaker provides a beep sound which served as a hint for the participants to start, to rest and to stop.

Jumping Rope Equipment. The rope jumping equipment used was made of 6 mm flexible PVC with ball bearings, weighing approximately 150-170 grams. The handle length is 5.25 inches and 1.25 in diameter. The length will be modified depending on the height of the participants, for convenient rope jump revolution, each rope will be adjusted to 3 feet higher than the height of each participant. Rope modifications, if any, can be made upon the approval of the teacher and following the rope jumping specifications. The administration of the physical fitness test was scheduled during first quarter of students' physical education classes

under the subject MAPEH during school year 2022-2023. The researcher has utilized the PACER Manual downloaded from www.nova.edu/projectrise as basis for the fitness test administration of the pre and posttest. The researcher and the SPS participants were performed the activity using a 20-meter open space including the use of marker tapes and cones, measuring tape, PACER CD, CD player, PACER Manual, copies of the score sheet, pencil, and a designated cool-down area with sufficient water for consumption. A copy of PACER Individual Score Sheet was presented in the appendices.

Table 1: Rope Jumping Exercise Program for SPS Students

		Monday			Wednesday		
Warm-Up		Set 1	Rest	Set 2	Cool Down		
Week 1	10 minutes	20 sec. rope jumping 10 sec interval x 12 rep (5 min and 50 sec.)	3 min and 20 sec	20 sec. rope jumping 10 sec interval x 12 rep (5 min and 50 sec.)	10 minutes		
Week 2	10 minutes	30 sec. rope jumping 15 sec interval x 9 rep (6 min and 20 sec.)	2 min	30 sec. rope jumping 15 sec interval x 9 rep (6 min and 20 sec.)	10 minutes		
Week 3	10 minutes	30 sec. rope jumping 10 sec interval x 10 rep (6 min and 30 sec.)	2 min	30 sec. rope jumping 10 sec interval x 10 rep (6 min and 30 sec.)	10 minutes		
Week 4	10 minutes	40 sec. rope jumping 15 sec interval x 7 rep (6 min and 10 sec.)	2 min and 40 sec	40 sec. rope jumping 15 sec interval x 7 rep (6 min and 10 sec.)	10 minutes		
Week 5	10 minutes	40 sec. rope jumping 10 sec interval x 8 rep (6 min and 30 sec.)	2 min	40 sec. rope jumping 10 sec interval x 8 rep (6 min and 30 sec.)	10 minutes		
Week 6	10 minutes	50 sec. rope jumping 10 sec interval x 6 rep (5 min and 50 sec.)	3 min and 20 sec	50 sec. rope jumping 10 sec interval x 6 rep (5 min and 50 sec.)	10 minutes		

The rope jumping exercise program tool was adopted from the thesis of Mr. Ireneo L. De Leon titled, "The Effects of Rope Jumping and Jogging on the Cardiovascular Endurance of the Grade 10 students". The researcher asked necessary approval of Mr. De Leon to use his rope jumping exercise program tool to this research study.

Data Analysis

The data collected from the result of the rope jumping activities of the participants were analyzed and interpreted using FITNESSGRAMS' Standard for Health-Related Fitness Zones (HRFZ) classified as follows: I =Needs Improvement Zone (does not meet health-related standard) F =Health Fitness Zone (meets health-related standard) H=High Fitness Performance Zone (exceeds health-related standard). The table presented below was the assessment rubric for the administration of PACER Test.

I=Needs Improvement Zone (does not meet health-related standard).

F=Health Fitness Zone (meets health-related

standard).

H=High Fitness Performance Zone (exceeds health-related standard).

	Age	I (Needs Improvement Zone)	F (Health Fitness Zone)	H (High Fitness Performance Zone)
Boys	14	0-40	41-83	>83
	15	0-50	51-94	>94
	16	0-60	61-94	>94
Girls	14	0-22	23-51	>51
	15	0-31	32-51	>51
	16	0-31	32-61	>61

The main statistical test used was the independent t-test. It was used to measure the significant difference in the physical fitness performance of the participants in the pre-assessment and post-assessment exercises utilizing the use of PACER test to determine the level of cardio-vascular endurance of the students.

Results

Table 2: Level of Physical Fitness of SPS students during the Pre-Assessment Period

Name	Sex	Age	Week 1	QI	Week 2	QI	Week 3	QI	Weighted Mean	Total QI
Student A	M	14	30	I	32	F	41	F	34.33	Needs Improvement Zone (I)
Student B	M	15	27	I	32	F	44	F	34.33	Needs Improvement Zone (I)
Student C	M	15	31	I	38	F	50	F	39.67	Needs Improvement Zone (I)
Student D	F	12	16	I	18	I	20	I	18.00	Needs Improvement Zone (I)
Student E	F	14	22	I	20	I	22	I	21.33	Needs Improvement Zone (I)
Student F	F	14	22	I	21	I	22	I	21.67	Needs Improvement Zone (I)
Student G	F	15	21	I	25	I	28	I	24.67	Needs Improvement Zone (I)
Student H	F	15	21	I	28	I	26	I	25.00	Needs Improvement Zone (I)
Male: Average Age:14.67			Pre-assessment Mean: Male: 36.11 Female: 22.13 Total: 27.38			Male: Needs Improvement Zone (I) Female: Needs Improvement Zone (I)				
Female: Average Age:14.00										

The students belonged to the experimental group were composed of eight (8) participants which were subject to pre-assessment activity utilizing the use of Jump rope exercise, the table revealed that there were 8 or 100.00 percent belonged to Needs Improvement Zone (I) as reflected in the pre-assessment mean of 27.38.

The *Alabama Physical Education Instructional Guide (2011)* suggested that Physical Education teachers should provide warm-up time prior to test and cool-down after the test to the students. Cardiovascular endurance is important not just to SPS student-athletes but even to ordinary athlete individuals or newcomers in the sports. This help individuals to improve their fitness and become flexible, independent and strong. It makes one capable to staying for a long-time

stress. Thus, in order to achieve this sense of cardiovascular endurance, one must be involved in exercises like jogging and rope jumping.

Furthermore, *Pate R, Oria M, Pillsbury L. (2012) [13]* explained that cardiorespiratory endurance has been recognized as a key component of physical fitness throughout the history of the field. People with good levels of cardiorespiratory endurance can perform large-muscle, whole-body exercise at high intensity for at least moderate durations before experiencing fatigue, and they can comfortably perform light- to moderate-intensity exercise for extended periods. With these concerns and issues, the implementation of fitness activities for SPS students is deemed necessary.

Table 3: Level of Physical Fitness of SPS students during the Post-Assessment Period

Name	Sex	Age	Week 1	QI	Week 2	QI	Week 3	QI	Weighted Mean	Total QI	
Student A	M	14	42	F	56	F	73	F	57.00	Health Fitness Zone (F)	
Student B	M	15	35	NI	56	F	73	F	54.67	Health Fitness Zone (F)	
Student C	M	15	41	NI	31	NI	60	F	44.00	Needs Improvement Zone (I)	
Student D	F	12	15	F	21	F	34	F	23.33	Health Fitness Zone (F)	
Student E	F	14	17	NI	23	NI	35	F	25.00	Health Fitness Zone (F)	
Student F	F	14	33	F	44	F	62	H	46.33	Health Fitness Zone (F)	
Student G	F	15	15	NI	26	NI	37	F	26.00	Needs Improvement Zone (I)	
Student H	F	15	15	NI	21	NI	33	F	23.00	Needs Improvement Zone (I)	
Male: Average Age:14.67			Post-Assessment Mean: Male: 51.89 Female: 28.73 Total: 37.41						Male: Health Fitness Zone (F) Female: Health Fitness Zone (F)		
Female: Average Age:14.00											

The students belonged to the experimental group were composed of eight (8) participants which were subjected to the post assessment activity utilizing the use of jump rope exercise and further assessed through PACER test, there were 5 or 62.50 percent belonged to Health Fitness Zone (F), while 3 or 37.50 percent were belonged to Needs Improvement Zone (I) as reflected in the post-assessment mean of 37.41.

According to *McClain, Welk, Ihmels & Schaben (2006) [12]*, the PACER test has been shown to be an effective assessment tool for many physical education programs. The

PACER test has been shown to be an effective tool to improve students' fitness because the progressive nature of the test includes providing warm-up exercise as to meet the following goals: (1) to prepare the body for the activity, (2) to improve performance, (3) and to reduce sports injuries, (PACER Fitness Test, 2012). Furthermore, the PACER test is a valid and reliable assessment of aerobic capacity in children. However, many schools lack adequate space to administer the test, (*McClain, Welk, Ihmels & Schaben, 2006) [12]*.

Table 4: T-test result of the Experimental Group in the Pre and Post-Assessment Periods

Group	n (sample size)	Pre-assessment Mean	Post-assessment Mean	Gain Score	t-value	t-crit	Remarks
SPS students (Experimental group)	8	27.38	37.42	10.04	0.0168	2.0129	Significant

p<.05 *equal variances assumed

Findings show that jump rope exercise can give positive impact to the cardiovascular endurance of the Special Program in Sports (SPS) students.

It like noted that there is a significant difference in the students' physical fitness performance of the experimental group in the pre-assessment and the post-assessment periods of the jump rope exercise activity and later assessed through PACER test as reflected in the p-value of 0.0168 which is less than the 0.05 alpha level of significance. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted, there is a significant difference on the students' physical fitness performance using a jump rope exercise to improve their cardiovascular endurance.

The SPS students as experimental group in the study yielded

a 10.04 gain score based on the result of pre-assessment mean of 27.38 and post -assessment mean of 37.41 which implies that the use of jump rope exercise is an effective strategy towards enhancing students' physical fitness.

DepEd Order 54, s. 1994 reiterates that cardiorespiratory endurance (CARE) is the most important component of physical fitness. It refers to the ability to maintain activity movement for an extended period. It involves the capacity of the heart, lungs and blood vessels to postpone the onset of fatigue thus enabling the body to persist in doing a strenuous task. Thus, the attainment of cardio-respiratory endurance follows a sequential pattern enhanced by exposure to various and vigorous physical activities. Furthermore, it is necessary to conduct regular and proper physical activities

by trained teachers in school.

In addition, the study of *Veena Kirthika, Lakshmanan, Padmanabhan, Selvaraj Sudhakar, Senthil Selvam (2019)*^[8] concluded that skipping rope exercise has a better improvement on cardiovascular fitness as well as physical fitness which is proved. Skipping rope training is really a good exercise for those people who want to maintain their

fitness level and it needs only lesser space to perform this exercise and affordable to everyone in this society. Hence, jumping rope training is a good choice for those who were having a sedentary lifestyle.

Proposed Action Plan for Enhancing the Cardiovascular Endurance of SPS Students

Enhancing the Cardiovascular Endurance of SPS Students						
<i>General Objective:</i> To improve the cardiovascular endurance of SPS students through the conduct of jump rope exercise and later assess using Progressive Aerobic Cardiovascular Endurance Run (PACER) Test.						
Key Result Area	Objective	Activities	Persons Involved	Target Output	Time Frame	Budget
Cardiovascular Endurance Test using Jumping Rope.	Enhance physical fitness of the SPS students using Jumping Rope.	Conduct Rope Jumping Activities: <ul style="list-style-type: none"> Engage SPS students in an easy to moderate rope jumping sessions. Engage SPS students in a moderate to intense rope jumping sessions. 	SPS student-athletes, coaches, and other student-athletes of the school.	<ul style="list-style-type: none"> Improved performance and ability of the SPS students in rope jumping. Enhanced understanding of the importance of rope jumping to improve physical fitness of SPS students. Improved the cardiovascular endurance of SPS students in playing their respective sports events. 	Quarterly.	MOOE/ Local Funds.
Training of Trainers (TOT) for Teacher-specialists and sports coaches in the school level- (Zambales National High School).	Develop the skills SPS teacher-specialists and other sports coaches in teaching jump rope exercise and proper assessment through using Progressive Aerobic Cardiovascular Endurance Run (PACER) and promote effective leaders in sports management.	Conduct Learning Action Cell (LAC) sessions on Rope Jumping Program as mass training for teachers: <ul style="list-style-type: none"> Provide teacher training for SPS Coaches and other sports coaches to help understanding the principles, test orientation, proper test administration and assessments of Jump rope exercise program. Focus on improving the knowledge, skills, and attitudes of SPS Coaches and other sports coaches in rope jumping exercise. 	SPS student-athletes, coaches, and other student-athletes of the school	<ul style="list-style-type: none"> Improved knowledge, skills and attitudes of SPS teacher-coaches in understanding physical fitness and in teaching fundamental principles of jump rope exercise. 	Quarterly.	MOOE/ Local Funds
Training of Trainers (TOT) for Teacher-specialists and sports coaches in the district level- (Iba District).	Develop the skills PE teachers and sports coaches in teaching jump rope exercise and proper assessment through Progressive Aerobic Cardiovascular Endurance Run (PACER).	Conduct of District-wide training on Rope Jumping Program as mass training for teachers in elementary and district schools: <ul style="list-style-type: none"> Provide teacher training for SPS Coaches and other sports coaches to help understanding the principles, test orientation, proper test administration and assessments of Jump rope exercise program. Focus on improving the knowledge, skills, and attitudes of SPS Coaches and other sports coaches in rope jumping exercise. 	SPS student-athletes, coaches, and other student-athletes in the district.	<ul style="list-style-type: none"> Improved knowledge, skills and attitudes of SPS teacher-coaches in understanding physical fitness and in teaching fundamental principles of jump rope exercise. 	Yearly	MOOE/ Local Funds
Training of Trainers (TOT) for Teacher-specialists and sports coaches in the division level - (Schools Division of Zambales).	Develop the skills SPS teacher-specialists and other sports coaches in teaching jump rope exercise and proper assessment through using Progressive Aerobic Cardiovascular Endurance Run (PACER) and promote effective leaders in sports management.	Conduct of Schools Division training on Rope Jumping Program as mass training for teachers in the division level: <ul style="list-style-type: none"> Provide teacher training for SPS Coaches and other sports coaches to help understanding the principles, test orientation, proper test administration and assessments of Jump rope exercise program. Focus on improving the knowledge, skills, and attitudes of SPS Coaches and other sports coaches in rope jumping exercise. 	SPS student-athletes, coaches, and other student-athletes of the division level.	<ul style="list-style-type: none"> Improved knowledge, skills and attitudes of SPS teacher-coaches in understanding physical fitness and in teaching fundamental principles of jump rope exercise. 	Yearly	MOOE/ Local Funds

Prepared by **Joey E. Caasi**

Conclusions

Based on the summary of the investigations conducted, the researcher concluded that:

1. The study found that 8 or 100.00 percent of the participants belonged to Needs Improvement Zone (I) in the assessment of their cardiovascular endurance as measured of their jump rope exercise as reflected in the pre-assessment mean of 27.38.
2. The study also revealed that there were 5 or 62.50 percent belonged to Health Fitness Zone (F), while 3 or 37.50 percent were belonged to Needs Improvement Zone (I) in the assessment of their cardiovascular endurance as measured of their Jump Rope exercise as reflected in the post-assessment mean of 37.41.
3. There is a significant difference in the students' physical fitness performance in the experimental group before and after the treatment as reflected in the t-value of 0.0168 which is less than the 0.05 alpha level of significance. Likewise, the SPS students as experimental group in the study yielded a 10.04 gain score, implying its effectiveness.
4. The fitness plan for SPS students appears to be a comprehensive and well-structured approach to enhance their cardiovascular endurance using jump rope exercises and assessed using PACER test.

Recommendations

Based on the summary of the investigations conducted and the conclusions arrived at, the researcher formulated the following recommendations:

1. Physical Education teachers may include jump rope as their fitness exercise before the start of their practical lessons as intervention to improve the cardiovascular endurance of the students. It is further suggested to Physical Education teachers to explain the benefit of the jump rope exercise to all student-participants.
2. Rope jumping exercise can be enjoyable when using musical applications and it is suggested to find a space large enough for the students to jump.
3. Physical Education teachers should intensify jump rope training using various styles in jumping such as Alternate Foot Step Jump, Boxer Step, Jump Rope Jacks, Criss Cross, Side Swing, Single Foot Jumps and many more which will help athletes to improve their balance, coordination, endurance and speed and can effectively improve their competitive level in sports.
4. Before the conduct of the jump rope exercise, the teacher should have prior knowledge or background on the health condition, history of illnesses and health physical evaluation of the participating students. It is further suggested to use PAR-Q survey before the conduct of physical fitness tests.
5. The test should be administered outdoors to validate the improvement of the students using the 20-meter distance. The use of gymnasium, covered courts and other similar venues in the utilization of the test is highly recommended.
6. Result of this study should be disseminated to all Physical Education teachers, school heads and coordinators so that an appropriate program plan for Physical Education classes may be developed based on the findings of the study.
7. Mass rope jumping shall be presented during "Field Day" and/or opening and closing program of provincial

and regional athletic meets as field exhibition.

8. The use of Jump Rope exercise and PACER test may be replicated to the district and schools' division levels.
9. Parallel study may be conducted to validate the effectiveness of the jump rope exercise to improve cardiovascular endurance to non-SPS students and to their profiles like age and grade level and to the attitude towards Physical Education practical activities.

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