

The effect of educational units of extra-curricular sports activity in developing endurance-strength among secondary school students

Moussaoui Abdelhai*¹, Hadj Sayad²,

¹ Hassiba Ben Bouali University of Chlef,
abdelhai19970522@gmail.com

² University of Science and Technology - Mohamed Boudiaf - Oran,
sayadsportsante@yahoo.fr

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Abstract: this study aimed to identify the effect of proposed educational units for extracurricular sports activities on developing endurance and strength among secondary school students. the researchers used the experimental approach, as this field study was conducted on a purposive sample consisting of 65 students (males and females) from secondary school. the endurance and strength test was applied to the study sample in order to identify individual differences between the average values of the sample members. statistical methods were used in this regard, including the spss statistical package, the arithmetic mean, the standard deviation, and the student t-test. it was concluded that there were statistically significant differences between the control and experimental samples in endurance and strength in favor of the experimental sample, and there were statistically significant differences between the pre- and post-tests of the experimental sample in endurance and strength in favor of the post-tests. therefore, the proposed educational units in the study have a positive impact on developing endurance and strength among secondary school students.

KEY WORDS : Extracurricular sports activity; Endurance-strength; High school .

المخلص: هدفت هذه الدراسة الى التعرف على أثر وحدات تعليمية مقترحة للنشاط الرياضي اللاصفي في تنمية التحمل - القوة لدى تلاميذ الطور الثانوي، وقد إستخدم الباحثان المنهج التجريبي، حيث أجريت هذه الدراسة الميدانية على عينة قصدية وقد تكونت من 65 تلميذ(ذكور-إناث) من المرحلة الثانوية، وقد تم الاعتماد على اختبار التحمل والقوة والتي تم تطبيقها على عينة الدراسة

* Corresponding Author.

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قصد التعرف على الفروق الفردية بين متوسطات قيم أفراد العينة، تمت الاستعانة في هذا بالوسائل الاحصائية المتمثلة في الحزمة الاحصائية SPSS، المتوسط الحسابي، الانحراف المعياري "ت" ستودنت، وتم التوصل الى وجود فروق ذات دلالة احصائية بين العينة الضابطة والتجريبية في التحمل-القوة لصالح العينة التجريبية ووجود فروق ذات دلالة احصائية بين الاختبارات القبلية والبعدية للعينة التجريبية في التحمل والقوة لصالح الاختبارات البعدية، وبالتالي للوحدات التعليمية المقترحة في الدراسة أثر ايجابي في تنمية التحمل- القوة لدى تلاميذ الطور الثانوي .

الكلمات المفتاحية: النشاط الرياضي اللاصفي ؛ التحمل-القوة ؛ المرحلة الثانوية .

1-Introduction:

Society is characterized by the clear differences among its individuals in their lifestyles, customs, values, and behaviors toward various situations. One of the most important factors that directs these differences toward positive and effective behavior is engaging in physical and sports activities, which enable the individual to deal with the social and environmental factors surrounding them and develop their personality in all its aspects. One of these activities is extracurricular sports. These are distinguished by their objectives, which include elements of performance development, such as speed, agility, flexibility, endurance, and muscle strength.

Muscle strength plays a major role in everyday life, but its importance increases for athletes, as it is an essential component of physical fitness (Khoshnaw, 2013) . As for endurance, It is considered one of the basic requirements that any sport depends on. The effort that the athlete exerts during training and competitions requires a physical and nervous burden on the body's various systems and organs, which is reflected in the occurrence of the phenomenon of fatigue. Weineek believes that the more solid the basic endurance capacity is, the later the athlete reaches the anaerobic sample. This

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sample is what determines the aerobic capacity of the athlete. (Michele, 1993)

Extracurricular activities are educational activities outside of school hours, and their primary goal is to provide an opportunity for outstanding students to raise their performance level. It also provides those with hobbies and desires with more sports practice hours, enabling those with weaker performances to address their weaknesses and improve their performance. Since the number of hours allocated to physical education and sports classes is insufficient (2 hours per week) to achieve the objectives of this lesson, acquire basic and initial skills, and practice effectively, extracurricular activities play a prominent role in addressing this deficiency. Extracurricular activities play a significant role in raising the quantitative and qualitative level of education. Their educational objectives extend beyond the classroom walls or school environment, contributing to the development of the student's personality in all aspects. The more balanced these aspects are, the more capable the student is of achieving mental health in their present and future lives (Ghabrini, 2023)

Hence, extracurricular activities enhance the physical abilities of the practitioner, most notably endurance, enabling them to perform various continuous exercises without fatigue or diminishing their motor performance. Another important aspect of these abilities is strength, which is an important element in all sports, regardless of their rules, laws, and method of practice. This is especially true during adolescence, a period characterized by significant growth and morphological and physical changes within the individual. Adolescence is considered one of the most complex and difficult stages of life for a person, due to the rapid changes that occur during this period, whether psychological, physical, or emotional, etc., which results in the emergence of many problems and crises for them (Youssef, 2021).

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From here, we can formulate our problem as follows:

- Do the proposed educational units for extracurricular sports activities have an impact on developing endurance and strength among secondary school students?

From this, the sub-questions derive:

- Are there statistically significant differences between the control and experimental samples in endurance among secondary school students?

- Are there statistically significant differences between the control and experimental samples in strength among secondary school students?

- Are there statistically significant differences between the control and experimental samples in strength among secondary school students?

- Are there statistically significant differences between the pre- and post-tests of the experimental sample in endurance and strength among secondary school students?

2- Study Hypotheses :

2-1- General Hypothesis:

- The proposed educational units for extracurricular sports activities have an impact on developing endurance and strength among secondary school students.

2-2- Substantial Hypotheses:

- There are statistically significant differences between the control and experimental samples in endurance among secondary school students.

- There are statistically significant differences between the control and experimental samples in strength among secondary school students.

- There are statistically significant differences between the pre- and post-tests of the experimental sample in endurance and strength among secondary school students.

3- Study Objectives:

- To develop an educational program using extracurricular sports activities to develop endurance and strength among secondary school students.
- To identify statistical differences between the control and experimental samples in endurance among secondary school students.
- To identify statistical differences between the control and experimental samples in strength among secondary school students.
- To identify statistical differences between the pre- and post-tests of the experimental sample in endurance and strength among secondary school students.

4- Significance of the Study:

The study relied on scientific and methodological foundations in its treatment of the subject, whereby practicing extracurricular sports activities improves many physical characteristics and motor abilities in individuals, including endurance and strength, which are considered important components of physical fitness for all sports, regardless of their type. It also develops psychological qualities and refines personality in all aspects.

5-Procedural definition of the concepts mentioned in the research:

- **Extracurricular Sports Activity** : Terminology: Dr. Abbas Ahmed Saleh believes that extracurricular sports activity is a sporting activity outside of the official school hours. One of its objectives is to provide opportunities for students who excel in their field, as well as those

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with a desire and interest to further engage in sports . (Saleh, 1981, p. 207)

- **Endurance and Strength:** Terminology: Strength is "the ability to endure external forces through muscular effort." Physiologically, we can define strength as the maximum tension produced by a muscle during contraction. Endurance: Kharabogi defines it as the ability to perform high-intensity work for the longest possible period, while Ozlin defines it as the individual's ability to perform a specific amount of physical activity for an extended period without interruption (Al-Jabar, 1984).

- **The Secondary Phase:** Technically: Ahmed Ezzat Rajeh defined it as the stage that can be identified by the onset of maturation of sexual functions and the individual's ability to reach full maturity (Saif, 2011).

6- Previous and Similar Studies:

6-1- A study by Azizou Mohamed, Boukratem Belkacem, and Madani Mohamed (2021):

Titled "The Extent of Contribution of Extracurricular Physical Activity to the Development of Motor Skills among Middle School Students."

The study aimed to understand the role of extracurricular physical activity in developing motor skills among middle school students. To this end, we used a descriptive approach on a targeted sample of 135 male and female students who participate in extracurricular sports activities in middle schools in Aïn Defla Province. A questionnaire was used to collect data. The results showed that extracurricular activities play a positive role in developing motor skills, creating a diverse group of students with physical readiness and abilities that enable them to develop the precision of skill performance.

6-2- A study by Bougharbi Mohamed, 2005 :

, entitled "Algerian School Sports in its Formal Aspects: Between Reality and Aspiration - A Comparative Study"

aimed to identify the status of Algerian school sports from a formative perspective and to draw the attention of managers and supervisors to the desired goals of school sports. This was done using a descriptive approach, with a research sample consisting of teachers from Algerian and French schools, chosen purposively. The researcher used both interviews and questionnaires. Among the most important findings:

- The lack of a clear strategy for defining programs for school sports.
- Decision-making remained confined to the Algerian Federation of School Sports, without the involvement of all those concerned with school sports, such as physical education and sports teachers and heads of school sports cultural associations.
- The existence of a single system of competition, which prevented school sports from achieving their goals.

As for French school sports:

- The existence of a clear strategy for defining programs for school sports, and a large and diverse number of Sports activities.
- Involving everyone in decision-making, including office members, association presidents, and physical education and sports teachers.
- The sports association carries out evaluation and follow-up operations.
- Continuous, quality coaching by the National Federation of School Sports.

6-3 A study by Iyad Hamid Rashid Al-Khazraji (2000):

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The Effect of Using Circuit and Station Training Methods on Developing Speed-Based Strength and Some Basic Handball Skills for 15-17 Year Olds, University of Baghdad, Iraq.

The study aimed to identify the effect of using circuit and station training methods on developing speed-Based Strength and some basic handball skills for 15-17 year olds. The sample included 24 players from the training center. The experimental approach was used, and the study tools included physical measurements and tests, exploratory experiments, and scientific experimental observation. The most important results include: Using the station training method to develop physical fitness components. Using the circuit training method to develop skill aspects.

6-4- Hamza Tarai, Abdelhakim Boulba's study, 2021:

A proposed program to develop speed endurance and strength endurance for 1500m half-distance runners, middle-aged (18-19) years old.

The study aimed to investigate the effectiveness of a training program to develop speed endurance and strength endurance among runners from the First of November Athletics Club in Tebessa Province. It also aimed to demonstrate differences in the pre- and post-measurements of the two research groups. The research sample was intentionally selected, estimated at 10 runners, divided into two groups. The program was then applied to the experimental sample to develop speed endurance and strength endurance. The program consisted of 8 weeks, i.e., 3 sessions per week. The results concluded that there were statistically significant differences in the development of speed endurance and strength endurance between the pre- and post-measurements, in favor of the post-measurements. There were also statistically significant differences in the development of speed endurance and strength endurance for both groups, in favor of the group that underwent the training program.

- Method and tools:

7- Study Methodology:

The experimental method was used to suit the nature of the research. This method enables the true testing of cause-and-effect relationship hypotheses (Rateb, 1999).

8- Study Population: The study population was selected from 145 students from secondary schools in Tlemcen province, who participated in various extracurricular sports activities.

9- Study Sample: The sample was determined purposively, consisting of 65 students (males and females) from secondary schools in Tlemcen province.

I chose purposive sampling in this research because it allows for the selection of students who possess specific characteristics relevant to the study topic, such as their regular participation in extracurricular sports activities.

This selection aims to ensure that the data collected is directly relevant to the topic of the impact of extracurricular sports activity units on developing endurance and physical strength. This method also allows for obtaining accurate and in-depth information from individuals who can effectively represent the phenomenon under study and contribute to achieving the research objectives.

10-Areas of Study:

-Time Frame: The study was conducted during the second semester of the 2024-2025 academic year, specifically during November and December 2024.

-location of the study : The study was conducted in several secondary schools as follows:

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- Ahmed Merbouh Secondary School, Sidi Djilali, Tlemcen Province, with 18 students
- Mahi Abdelkader Secondary School, Sebdou, with 17 students
- Guidari Yahya Secondary School, El Aricha, with 19 students
- Brothers Boukrabila Secondary School, Sebdou, with 11 students

11- Data Collection Tools:

The following appropriate tests were used for the study:

11-1- Endurance Test:

- 5-minute Brixie Test:
- **Purpose of the test:** To measure the efficiency of the circulatory and respiratory systems, and maximum oxygen consumption.
- **Test Description:** Testers are instructed to cover the greatest possible distance during the test duration.
- **Test Features:**
 - Non-stop running.
 - Walking is not permitted.
 - Maximum speed.
- **Duration:** 5 minutes.

Performance Instructions:

- Allocate a warm-up period ranging from 10 to 20 minutes.
- The test is performed in groups to ensure competitiveness.
- The tester may assume a high-start position.

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- The tester must begin the test by giving the testers permission to begin.
- If a tester stops, they are immediately disqualified and given sufficient rest to retake the test.
- Scoring: The total distance covered during the test is calculated.

Table (1): Suggested levels for the 5-minute Prexa-Gri test

The result	Rating
1310 and above	Excellent
1165	Average
1020 or less	Poor

11-2- Strength Test:

- 2 kg medicine ball throw test with hands behind the head
- Purpose of the test: To measure the muscular strength of the arms (the ability to produce maximum force in the shortest time)
- **Equipment:** 2 kg medicine ball, measuring tape
- Method of performance: The measuring tape is placed on the sideline of the court to facilitate the referee's calculation of the distance.

The test taker assumes the starting position for the test, holding the ball with both hands and standing with their back to the measuring tape or throwing area. The test taker swings their arms and throws the ball behind their back for the longest distance.

-Rules and Conditions:

- Do not raise your knees off the ground during the throw.
- The throw must be made from behind the starting line.

-Recording:

- The distance recorded is recorded to the nearest 5 cm.
- The examiner is given three attempts, with the best being counted (Hassanin, 2003).

11-3- Proposed Instructional Units for Extracurricular Sports Activities:

The instructional units were reviewed by physical education and sports specialists at the Mohamed Boudiaf Institute of Physical Education and Sports in Oran. They consisted of two sessions per week for six weeks. They included a general warm-up, followed by a specific warm-up, the main phase of the session, and a final phase that included a return to calm and relaxation.

12- Psychometric Properties of the Study Tool:

12-1-Reliability:

We used a method to calculate test reliability, namely the test-retest method. This method aims to determine the proportion and value of the temporary factors in the test. Based on this method, we conducted the test in two stages, with a time interval of 10 days, keeping all variables constant (same place, same sample, same time).

Table 1 shows the reliability coefficient for each of the study tests.

Significance level	Table value of the stability	Certified stability	Tests
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	coefficient	coefficient	
0.05	0.61	0.77	endurance tests
		0.91	Strength test

• Analysis of the results:

From Table 1, which represents the reliability coefficient for each of the study's tests, we note that the reliability coefficient for the endurance test reached 0.77 and the reliability coefficient for the strength test reached 0.91. These values are greater than the tabular reliability coefficient, which was estimated at 0.61, at a significance level of 0.05. Therefore, it can be said that the study's tests are characterized by reliability.

12-2-Validity:

One of the most important conditions for a good test is validity, which means that the test actually measures the ability or trait it was designed to measure. The validity of a test or scale refers to the degree to which it measures what it was designed for. To ensure the validity of the questionnaire, we used self-validity, which is measured by calculating the square root of the test's reliability coefficient.

Table No. 02: Shows the value of the validity coefficient for each of the study tests.

Significance level	Table value of the coefficient of truth	Calculated stability coefficient	Tests

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0.05	0.61	0.87	endurance tests
		0.95	Strength test

• Analysis of Results:

From Table 2, which represents the reliability coefficient for each of the study's tests, we note that the reliability coefficient for the endurance test reached 0.87 and the reliability coefficient for the strength test reached 0.95. These values are greater than the tabular reliability coefficient, which was estimated at 0.61 at a significance level of 0.05. Therefore, it can be said that the study's tests are characterized by reliability.

12-3 Objectivity:

These tests were selected after reviewing numerous theoretical studies and their inclusion in more than one reliable source. We found that they achieve the desired objectives of this study. Numerous scientific studies and references that have used some or many of these tests indicate that they are characterized by high reliability and validity coefficients, and thus are characterized by objectivity.

13 - Statistical Tools:

In order to arrive at objective and scientific results, several statistical methods were used, the most important of which are:

- SPSS program.
- Arithmetic mean.
- Standard deviation.
- Student's t-test.

- Results and Discussion:

1- Presentation and Analysis of the Results of the First Hypothesis:

- There are statistically significant differences between the control and experimental samples in the endurance test among secondary school students.

Table (3): Shows the "t" value between the scores of the control and experimental samples on the endurance test among secondary school students.

Statistical significance	Significance level	Tabulated t-test	Calculated t-test	Standard deviation	Arithmetic mean	The two groups
Statistically significant	0.05	1.62	2.20	4.56	21.12	Control sample
				3.89	22.52	Experimental sample

• Analysis of Results:

From the results presented in Table (3), we can see that the arithmetic mean for the control sample of students was (21.12), with a standard deviation of (4.56). As for the experimental sample, the arithmetic mean was (22.52), with a standard deviation of (3.89).

After calculating the (t) value to determine the significance of the differences between the two samples, it was (2.20), and the tabular "t" was (1.62) at a significance level of 0.05. This means that there are statistically significant differences between the control and experimental samples in the endurance test in favor of the experimental sample.

2- Presentation and Analysis of the Results of the Second Hypothesis:

- There are statistically significant differences between the control and experimental samples in strength among secondary school students.

Table (4): Shows the "t" value between the scores of the control and experimental samples on the strength test among secondary school students.

Statistical significance	Significance level	Table d t-test	Calculate d t-test	Standard deviation	Arithmetic mean	The two groups
Statistically significant	0.05	1.62	1.94	4.42	22.8	Control sample
				4.56	23.8	Experimental sample

• Analysis of Results:

From the results presented in Table (3), we can see that the arithmetic mean for the control sample of students was (22.89), with a standard deviation of (4.42). As for the experimental sample, the arithmetic mean was (23.82), with a standard deviation of (4.56). After calculating the t-test to determine the significance of the differences between the two samples, the t-test was (1.94), and the tabular t-test was (1.62), at a significance level of 0.05. This means that there are statistically significant differences between the control and experimental samples in the strength test in favor of the experimental sample.

3- Presentation and Analysis of the Results of the Third Hypothesis:

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- There are statistically significant differences between the pre- and post-tests of the experimental sample in endurance and strength among secondary school students.

Table (4): Shows the t-test value between the pre- and post-test scores in endurance and strength among secondary school students.

Statistical significance	Significance level	Tabulated t-test	Calculated t-test	Standard deviation	Arithmetic mean	The two groups
Statistically significant	0.05	1.62	1.86	4.04	29.81	Control sample
				5.13	30.32	Experimental sample

• **Analysis of the results:**

From the results presented in Table No. (4), it is clear to us that the arithmetic mean of the pre-test was (29.81) with a standard deviation of (4.04), while in the post-test, the arithmetic mean was (30.32) with a standard deviation of (5.13). After calculating the (t) value to determine the significance of the differences between the two tests, it reached (1.86) and the tabular "t" reached (1.62), at a significance level of 0.05. This means that there are statistically significant differences between the pre- and post-tests in endurance-strength in favor of the post-tests. This is what was proven by the study of Hamza Tarai and Abdel Hakim Boulba 2021, which aimed to study the effectiveness of using a training program to develop speed endurance and strength endurance and to determine its effectiveness among runners of the First November Generation Athletics Club in Tebessa Governorate, with a sample of 10 runners, divided into two groups. The results concluded that there are statistically significant differences in the development of Speed endurance and strength endurance were measured in favor of the post-test. There were statistically significant

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differences in the development of speed endurance and strength endurance for both groups, in favor of the group that underwent the training program.

- Conclusion:

The study reached several important conclusions, embodied in the following:

- Extracurricular sports activities contribute to improving students' overall physical abilities and motivating them to participate in various settings other than their educational institutions.
- Students are highly interested in extracurricular sports activities, due to the competition and enthusiasm they experience between local and state teams.
- Physical fitness elements play a significant role in students' motor performance, particularly endurance and strength.

Through field research and the application of the proposed educational units to the study sample, extracurricular sports activities have proven their effective and positive role in developing endurance and strength among secondary school students.

Based on the information gathered from our study, several suggestions can be made that will benefit future researchers. These include:

- Emphasis on continuous motivation for students to participate in activities outside of classroom instruction.
- Addressing deficiencies in extracurricular sports activities and providing various facilities and capabilities for successful and organized practice.

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- Developing training programs specifically focused on endurance and strength, given their importance in enhancing adolescents' motor performance.
- Conducting further descriptive and experimental studies and research on extracurricular sports activities with diverse samples and in different locations.

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