
Effect of Micro-learning Units Method Using Specific Exercises to Develop Explosive Power and Improve Performance Learning and Achievement in Shot Put for Students

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ABSTRACT

Background: The aim of the present study is to develop and apply an instructional program based on small, condensed learning units, along with specifically designed exercises to teach the shot put event to students. The research has two basic purposes; the first is to find out the effect of this method of instruction on the development of explosive power on the basis of the learning process and the second to investigate the effect of the small-unit learning method combined with the special exercises on the refinement of technical execution and the increase of achievement level in the learning activity of shot put among students who constitute the experimental class.

Methods: The research approach used is experimental method which is considered one of the best and reliable technique to get scientific knowledge about a certain problem. This is because it can predict results, control the variables of the study, and make it easier to draw conclusions and understand the causes of the study. The goals set by the researcher and the methodology chosen for the implementation of the goals had a significant impact on the type and composition of the target population and the sample selected from it. The researcher determined the study population to be the first-year students of the College of Physical Education and Sports Sciences (CPES) with a total of 600 students spread in six academic sections. These sections were chosen by random selection (drawing of lots) and subsequently, Section (C) (24 students) was selected as the experimental group. Following removal of students who were ill or not making sufficiently well, there were 20 students in the experimental group. This group was given instructions through small education units method with specific exercises. In a parallel drawing method, section (W) was drawn as the control group, which was the normal method used with physical education lessons. A similar group of 20 students was assigned to this group in a random lottery procedure, so that all students could be equitably divided between the two groups.

Results: The results of the study indicated that the teaching based on small learning units together with the specific exercises had a significant impact on the learning process of a shot put skill. This method had been proven to improve the physical abilities associated to the activity (such as explosive power) along with the psychological state of the pupils included in the sample, who showed a satisfactory level of strength.

Conclusions: That the small learning unit method with the use of special exercises was more effective than the conventional instructional method in physical education classes in terms of both learning and technical performance of the shot put and improving the overall level of achievement of the subjects of the sample.

Keywords: Micro-learning Units; Specific Exercises; Explosive Power; Shot Put.

INTRODUCTION

In the advanced countries, a lot of attention has been given to physical education and its importance in educating the individual and preparing him in a wholesome way in all aspects of his personality: mental, physical, psychological, and social (Dyson, 2026; Shirotriya & Beighle, 2026; Syaukani et al., 2023). Physical education is a unique type of education which aims to achieve physical, cognitive, social and psychological goals by selecting appropriate types of motor activities, which involve balanced, comprehensive growth and shaping of behaviour under a well planned and deliberate supervision (Dyson, 2026; Ferraz et al., 2024).

Self-teaching is a science and an art. To ensure this discipline is relevant to current trends and developments, and anticipates the future, it is vital that specialists and practitioners in the field of physical education undertake study that will help the movement of sport progress and evolve in the future. It is only so that the field can be truly ready and able to comprehend and utilize modern technology in teaching and learning (Huang & Yu, 2022; Sareddy & R, 2025).

Considering that physical education is an integral part of general education and that it is a means by which the social, psychological and health needs of the citizen are met through a variety of physical activities, planned with social, psychological and health goals in mind, it is necessary to plan programs of activities, which will produce beneficial effects for growth and development, effects that will be transferred into physical attributes incorporated into a highly efficient motor system (McMullen & Rogers, 2020; Pelana, 2014).

The scheduling of physical education lessons based on a unit approach to teaching and learning needs to be given significant consideration, as well as the delivery of specific, structured, and practically oriented activities that are designed to add excitement and engagement to the learning process. An educational unit delivered using a specific arm power exercise which is directly focused on developing explosive arm power is directly related to the performance and the overall success of the activity being delivered (Jiao et al., 2025; Nobari et al., 2023).

Based on his own experience in teaching track and field, the researcher noted that most of the physical education students had difficulty learning the shot put, especially smooth performance of technical phases of the activity, and skillful transitions between technical phases, and the uninterrupted execution of the crawling movement without disturbing the technical characteristics of each phase.

The flow of a lesson is a crucial factor in the success of a lesson. A well-structured lesson is not only a sure way to achieve good results, but it also has a positive impact on the overall learning atmosphere, further developing the relationship between teacher and students as well as the students themselves. On the contrary side, if the lesson is not constructed as planned, students' ability to concentrate will decrease throughout the lesson, and they will not learn what they were supposed to learn, nor will they be able to understand the material they are supposed to understand.

All learning processes rely on organizational processes, and any pedagogical method, for that matter, must be based on a strong organizational base. Much of the student body has low levels of effectiveness, thereby reinforcing the rule: all performance of pedagogical procedures can be achieved only in an organized mode. This framework includes, among other considerations, advanced and varied motor activities adapted to students, continuous changes in spatial layout, suitable students' distribution in the classroom, suitable grouping of students into learning units, and diversification of the exercises used, as well as training load and rest periods. Considering all these factors, the researcher set up his research problem on the use of a small learning-unit approach using specific exercises to develop explosive arm power, to facilitate learning and improve the achievement of the students.

Research Objectives: The study aimed at developing a curriculum that was adapted to the small unit method with special exercises focusing on enhancing the students' learning effectiveness especially on students' weight-related consideration, to find out the effect of the small unit method using special exercises on the improvement of student's learning outcome and on the improvement of technical performance and achievement of the experimental group in the

shot put activity and to determine the effect of the small unit learning approach using special exercises on the improvement of the students' technical performance and achievement in the shot put activity.

Research Hypotheses: The study is aimed to test the following hypotheses: The method of small educational units using special exercises has a positive influence on student's learning; The method of small educational units using special exercises has a positive influence on improving the technical performance and achievement of students in the area of shot put effectiveness; Statistically significant differences exist between the effect of small educational unit method using special exercises and the conventional method used by the teacher in teaching effectiveness of the shot put.

Research Domains: Human domain: First year students of the College of Physical Education and Sports Sciences at Al-Muthanna University. Temporal domain is the period from March 1, 2025 to May 25, 2026. Spatial domain: Stadium of Al-Muthanna University – College of Physical education and Sports sciences.

METHODS

Research Methodology

The experimental method is considered to be one of the best ways of reaching scientific knowledge on a particular problem; the researcher can make predictions about the results of the experiment and can manipulate the process of conducting the experiment and the interpretation of the causal relationships involved. The nature of the population or sample selected is determined by the specific objectives that a researcher sets for a particular study combined with the procedures that are used to attain these goals. The target population of this study consisted of the first year students of the College of Physical Education and Sports Sciences with a total of 160 students in six sections. After a random choice of one of the study sections, section (C) was chosen, which originally contained 24 students. The size of the experimental group was 20 students (after excluding four students because of illness or academic failure), where they were given instruction based on the method of small teaching units with special exercises. A second draw was conducted and the control group (W) was made up of 20 students and they used the traditional/customary method. In either case, students were randomly drawn into one of the two groups.

Selection of Tests

The physical and skill-related tests in this study were chosen as follows: 1) A vertical jump test was selected to evaluate the explosive power of the leg muscles; 2) A front-support (plank-type) test was selected to evaluate the strength endurance of the arm muscles; 3) A technical performance test was selected to evaluate how well the weightlifting skill was performed; 4) A technical achievement test was selected to evaluate the numerical/quantitative result of the weightlifting exercise.

Pilot Study

An exploratory (pilot) study was carried out on March 16, 2025. The purpose of this preliminary trial was to establish the time needed to present the exercises, and to check on the accuracy and reliability of the instruments and tools used; to determine any errors that could occur during the main experiment, and eliminate them; to confirm that the environment selected for the main experiment was suitable; and to acquaint the assisting/support team with the nature and requirements of the work to be done.

Pre-Tests

After two initial units of instruction, the pre-tests were given to the study sample on March 19, 2025. These introductory units involved explaining the weight lifting exercise and the different technical stages of the exercise, and how the tests themselves would be used; their timing and number of repetitions. The sample then experienced the higher level skills in both of these instructional units and pre-tests (pre-) were administered on the selected measures at the end of

the second unit including technical performance and the numerical achievement that was assessed in the shot put activity.

Instructional Curriculum

Instructional curriculum was eight learning units, two introductory learning units, two learning units per week for a duration of 90 minutes for each learning unit. The preparatory section of the units was typically 15 minutes long and included three parts: 3 minutes of general warm-up which focused on physical preparation, 5 minutes of specific warm-up which focused on the specific unit. As it was a key component in each learning unit, the main part took 65 minutes, with two parts: 10 minutes of theory to give the group information about how to use the small learning units and specific exercises, and what time to use them; and 55 minutes of practice, where the group was split up into smaller learning units. The purpose of using the small learning units with targeted exercises was to develop the necessary explosive power for the activity and the use of hurdles of different heights to develop the necessary leg strength. The splitting up of the bigger group into smaller organised groups was planned to achieve the activity's objectives. The unit ended with a 10-minute closing activity, which included recreational activities, general relaxation of the body and a goodbye.

Post-Tests

After completing the 8 instructional units, post tests were given to the study sample on Sunday, May 18, 2025 at 10:00 AM. The researcher made every effort to hold conditions the same when conducting the pre test and post test session, using the same assisting team, instruments and equipment. The participants had three valid attempts to participate. The data for the tests were obtained at the end of the experiment for comparison to the pre-test data.

RESEARCH RESULTS

After applying proposed methodology, conducting tests, and obtaining results, they were statistically analyzed.

Table 1. Shows means, standard deviations, (t) values and their significance between pre- and post-measurements of variables for control group

Variables	Measurement unit	Pre-test		Post-test		Calculated (t) value	Sig. level
		Mean	Std	Mean	Std		
Shot Put (Achievement)	Meter	7.46	0.51	8.96	0.59	6.49	Sig.
Shot Put (Performance)	Degree	1.66	0.65	5.45	1.18	11.86	Sig.
Vertical jump	cm.	36.8	40.0	44.5	0.67	48.26	Sig.
Medicine ball throwing	Meter	6.42	0.51	6.58	0.58	1.28	Sig.
Push up	Rep.	23.75	3.56	33.35	1.54	9.45	Sig.

Value of (t) is 2.093 at a degree of freedom of 1.9 under a Sig. level of 0.05.

Table (1) shows that there are statistically significant differences between pre-test and post-test for control group, in favor of post-test for study variables, because calculated t-value is greater than tabulated t-value at significance level of (0.05) and at a degree of freedom of (19), which is (2.093).

Table 2. Shows means, standard deviations, and (t) values and their significance between pre- and post-measurements of variables for experimental group

Variables	Measurement unit	Pre-test		Post-test		Calculated (t) value	Sig. level
		Mean	Std	Mean	Std		
Shot Put (Achievement)	Meter	8.96	0.59	10.34	0.66	12.98	Sig.
Shot Put (Performance)	Degree	5.46	1.18	6.25	1.22	8.83	Sig.
Vertical jump	cm.	44.5	0.67	55.5	1.00	40.88	Sig.

Medicine ball throwing	Meter	6.58	0.58	7.85	0.52	13.84	Sig.
Push up	Rep.	33.35	1.54	36.5	1.73	6.28	Sig.

Value of (t) is 2.093 at a degree of freedom of 1.9 under a Sig. level of 0.05

Table (2) shows that there are statistically significant differences between pre-test and post-test for experimental group, in favor of post-test for study variables, as calculated t-value is greater than tabulated t-value at significance level of (0.05) and at a degree of freedom of (19), which is (2.093).

From the results obtained above it is clear that both the Control and Experimental groups have shown statistically significant difference between pre and post test results and there is clear superiority in the post test results. The researcher attributes this to the use of an appropriate well-structured training method with careful selection of activities which were appropriate to the physical characteristics and demands relevant to the activity being studied. The correlation of method and type of exercise selection was directly related to the learning process and the acquisition of the skill in both groups.

The effectiveness of the weight lifting exercises program in the educational curriculum in the experimental group and the appropriateness of the level of the research sample was clearly reflected in the number of exercises and repetitions that the sample did throughout the teaching phase. This regular exercise enabled the participants to gradually acclimate to the demands of the exercises, strengthening both the strength and the efficiency of their movements.

The same manner, the control group, who performed the same overall training method, also displayed a positive and measurable improvement in the performance of the technical phases (technique) of the high jump. This improvement was seen in both the experimental and control group, suggesting that the intervention method employed had a general positive effect irrespective of group allocation.

The general results indicate a clear advantage in motor performance level with weightlifting in the post-test (dimensional) measurement, further validating the importance of exercise-specific training programs for the improvement of strength and technical qualities in athletics.

Table 3. Significance of differences between post-tests of two groups

Variables	Measurement unit	Pre-test		Post-test		Calculated (t) value	Sig. level
		Mean	Std	Mean	Std		
Shot Put (Achievement)	Meter	8.96	0.59	10.34	0.66	12.98	Sig.
Shot Put (Performance)	Degree	5.46	1.18	6.25	1.22	8.83	Sig.
Vertical jump	cm.	44.5	0.67	55.5	1.00	40.88	Sig.
Medicine ball throwing	Meter	6.58	0.58	7.85	0.52	13.84	Sig.
Push up	Rep.	33.35	1.54	36.5	1.73	6.28	Sig.

Value of (t) is 2.093 at a degree of freedom of 1.9 under a Sig. level of 0.05

Table (3) shows that calculated (t) values between post-test results of two groups (experimental, control) are greater than tabulated value. (2.024) at a degree of freedom of (3.8) and below a significance level of (0.05), this indicates significant differences between two groups in favor of experimental group in study variables. The researcher attributes this result to a growth and refinement in all data and drills directly related to motor performance a result that represents a real technical improvement. The use of small learning units on the basis of specific exercises, in particular, contributed to this progress, as it had favourable effects on reducing the students' difficulties in producing the required level of force to perform the technical skills. Since this is the case, students were afforded ample time to develop the power needed for the pushing movement that underlies this skill without too much fear of not being able to achieve a desired result. This, in turn, gave them a greater opportunity to perform the exercises in every activity at

fuller repetition count, increasing their chances of success and the amount of time spent on actual performance. The technician also observed that an increase in the time spent performing the skill results in increased physical capacity, and that corrections of errors in the performance of the skill also leads to an increase in the ability to coordinate the body segments involved in the performance to reach the targeted goal. This was further supported by Khairiya, who noted that the use of the methods and techniques in education that have direct and targeted impact, that is, selected mainly based on the type of weakness and shortcoming of the performance, ensures that the development effect of the intervention is appropriately matched with the type of weakness or performance shortfall, thus improving overall performance.

DISCUSSION

Statistically significant differences between pre and post test data are shown in Table (1). The researcher thinks that such differences are related to the application of the illustrative method that could make the activity easier to understand, to comprehend and to perceive for the control group which was taught the shot put using the conventional method. This was done by a clear and sequential presentation of the technical phases of the throw of the shot put, with the support of various scientific sources. Learning with images that have been embedded in the teaching and learning process along with a demonstration of the activity in real, helped learners understand, perceive and grasp the nature of the movement as shown in Table (2). The difference found also between pre- and post-tests of the experimental group (small learning units using the method of specific exercises) is also statistically significant. This method allowed students to use their subliminal potential in order to develop the physical skills of the shot put, which were clearly seen in the post-test results, in addition to better learning and performance in the shot put activity. The researcher attributes the significance of these differences to the positive influence of this teaching method, as using small learning units, which are provided with specific tasks, created opportunities for creativity that the students showed in the lesson. The results of the post-test in group 2 (research) and group 1 (control) are statistically significant as presented in Table (3) indicating that the research group has significantly obtained better results than the control group.

The researcher believes that the students do not feel frightened of not being able to get good results in learning, and by applying the method of small learning units and giving specific exercises in the learning process, that students are more motivated to learn and keep up their enthusiasm in learning. It enables the students to have more attempts to complete the task than in other ways and it creates strength by gradually increasing the number of repetitions of the chosen exercises in a scientifically sound way. Scientific studies have shown that the rate of action of the muscles is related to the intensity of the stimuli involved, and that the rate of action can be accelerated by repeated and progressive training that accelerates the rate of muscle contraction.

CONCLUSIONS AND RECOMMENDATIONS

Pre-test and post-test measurements for all tests showed statistically significant differences between pre-test and post test for both groups, and always favored the post-test measurement, showing measurable gains in both groups throughout the entire intervention. Moreover, the post-test scores of the two groups showed statistically significant difference in favor of the experimental group, which indicated that the experimental group that was treated with the intervention had better results than the control group that was treated with the traditional teaching methods. The results suggest that the use of small learning units with special and targeted exercises had a successful impact on the learning of the shot put skill. This method of training helped to develop the technical aspect as well as the physical ability of the person to carry out the activity, including the muscular strength and coordination needed to do the activity well. Furthermore, this approach affected participants in the sample's psychological condition, especially those who already had a sufficient strength level, motivating them to grow in self-assurance and preparation to successfully implement the skill. The overall findings indicate the small learning unit method with specific exercises more effective than the traditional approach of

teaching in the class based physical education. This method proved to be most effective in the learning and refinement of the technique of the shot put, and also in improving the overall level of achievement in this skill by the participants.

It is urgent to pay attention to the introduction of a method of small educational units, using special exercises as a tool for improving the effectiveness of learning the shot put skill and track and field events in general among different age groups. This highlights the need for additional studies which use a variety of teaching methods to develop and teach technical performance in the shot put event. This requires the development of learning programmes with several pedagogical indicators and instruction methods, primarily in terms of the way small learning units are designed based on pedagogical specific and focused exercises. The utilization of this approach can be proven to be able to inspire students to be enthusiastic and eager in learning the material, as well as making students less feel unconfident and unable to get the desired result (providing motivation to continue and persist in learning process). Based on the findings in this study, it is suggested that further research and investigation be undertaken on other age groups, other sporting activities and other athletic events to test the generalisability and effectiveness of this education approach.

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