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The Effect of an Educational Program Using the Differentiated Instruction Strategy in Learning Long Jump Effectiveness

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Abstract

Background: Traditional teaching methods usually focus on the educational material and neglect the learner. Because education concerns all learners, regardless of their abilities and level of performance, for the purpose of further integrating the learner in teaching skills and activities, and for the sake of advancing the vocabulary of athletics, it is important to understand the best way to acquire complete knowledge of technical stages of long jump effectiveness by choosing the most appropriate methods and strategies that have a positive interaction between learners to be more rapid and accurate. *Objective:* The effect of an educational program using the strategy of differentiated instruction and identifying its effect on the level of technical performance of long jump effectiveness according to the peer-to-peer application method depends on the feedback provided by colleagues. *Materials and methods*: The research sample consisted of (20) students from the first school year in the College of Physical Education and Sports Science, Kirkuk University, for the 2019-2020 academic year. Participants were divided into two equal groups. The two groups implemented an educational program consisting of (8) educational units. Two educational units were undertaken per week, with each educational unit lasting (90) minutes. The main part of the lesson, specifically in the applied activity of the educational unit, was implemented in the differentiated instruction method for the first group and in the traditional instruction method for the second group. *Results*: Statistically significant differences were found between the pre- and post-tests of the control and experimental groups in the variable of the degrees of (technical performance) for the effectiveness of the long jump, achieving an improvement percentage (14.085%, 70.940%) and effect size (0.762, 3.283) respectively. Statistically significant differences were also found between the control and experimental groups in the post-test in the variable of the degrees of (technical performance) for the effectiveness of the long jump, achieving an improvement percentage (56,856%) and effect size (2,480). *Conclusions*: The educational program using the differentiated instruction method has a high impact on the degrees of (technical performance) for the effectiveness of the long jump

Keywords: physical education, skill, traditional method, technical performance, learning.

Introduction

To be effective, teachers need to tailor their content and instruction to the specific learning readiness and interests of their students by integrating concepts and teaching strategies that are responsive to the students' diverse needs (Dill, 1990) (Jewett & Bain, 1985). Differentiated instruction (differentiated education strategy) provides a conceptual model that

focuses on individual student learning through a series of systematic processes (Tomlinson C. , 1995). Teachers today compete to apply modern strategies in teaching. Education outcomes are not commensurate with inputs, which is clear in our educational institutions, as the learner has become a collection of knowledge and information, which makes the learner negatively dependent on automatic memorization. In order to achieve effective teaching and diversification in teaching, it is necessary to use strategies that suit the level of learners, whether individually or collectively. Teaching by invitation allows students to choose one of the various difficulty levels for a particular task (Graham, Holt/Hale, & Parker, 2010). It is necessary to simplify and scale the content of lessons, especially during the application of sporting events, which requires a physical education teacher to use a special flexible strategy that develops with scientific development and varies with the difference in purpose and according to the nature of learners.

An important facet of (differentiated education strategy) is the continuous focus of the teacher on the student as an individual rather than a focus on a set of practices that individualize or adapt learning tasks. Specifically, (Colquitt, Pritchard, & Johnson , 2017). In addition, physical education teachers are familiar with considering student readiness when planning developmentally appropriate learning experiences. Indeed, (differentiated education strategy) shares many similarities with developmental best practices, such as a focus on individual appropriateness, goals, and success rather than age appropriateness (Gallahue & Donnelly, 2003). The learner can be given an opportunity to become a person who makes decisions through a differentiated education strategy according to the peer-to-peer application method, which is considered an entry point that helps the teacher to identify the various needs of learners and then respond to these needs within the same class. Student interest is constantly changing, and it can be influenced by teaching methods, opportunities to practice, and perceived competence (Garn, Cothran, & Jenkins, 2011).

Although providing flexible product options may be difficult for some to conceptualize, teachers must keep in mind that assessments are simply tools that serve to produce representations of student learning in a unit (Metzler, 2011). According to the peer-to-peer application method, the differentiated education strategy depends on the feedback provided by the colleague for cancelling orders as a student performs the work. Based on the feedback, the other student notices the performance of his colleague, and then they can exchange performances. As for the teacher, he notices and guides.

Differentiated instruction benefits students with a very wide range of ability levels (Neber, Finsterwald, & Urban), learning styles, and cultural/linguistic backgrounds (Convery & Coyle, 1993). Moreover, grouping strategies and combining them with diverse instructional strategies for variations in access to content can further differentiate learning tasks. Flexible grouping is the most important tactic in differentiating process activities (Santangelo & Tomlinson, 2012). Hence the usefulness of the differentiated education strategy according to the method of applying peer in the sports field that achieves the conditions of effective learning through diversification in teaching methods, thus enabling each learner to interact with his colleagues to obtain knowledge and develop his skills according to his capabilities.

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Methods

Participants

The community of 1st stage students from the College of Physical Education and Sports Sciences, Kirkuk University, for the 2019-2020 academic year has been identified. These (120) students were distributed into (3) divisions (A, B, and C), and (20) students from the two divisions were selected (A, B) and were divided into two equal groups of (10) students so that the first group was experimental and underwent the educational curriculum according to the method of differentiated education with the guidance of their peers, while the second (control) group was educated according to the traditional curriculum (followed), and formed (16.67%) of the original research community.

Experimental design:

The researcher used the experimental design for equal, random groups with controlled pre and post-tests, as shown in Figure (1):

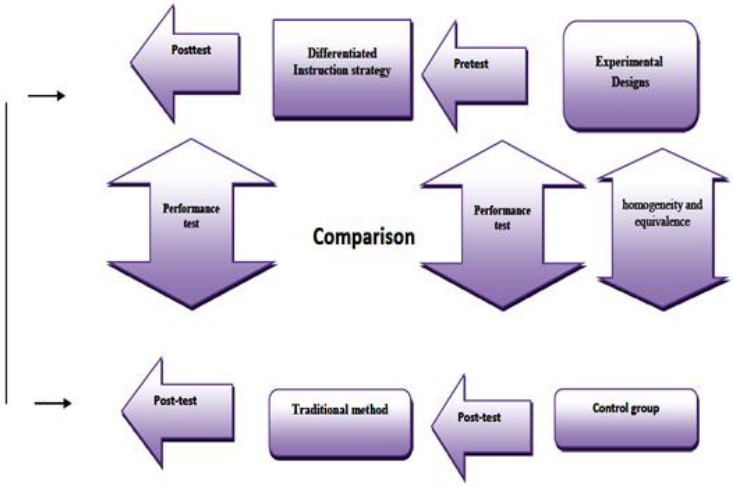

Figure 1: The experimental design of the two study groups in the pre- and post-tests.

Physical tests

On Wednesday (4-12-2019), the researcher conducted the following physical tests:

1. Running test for (30) meters to measure the transition speed from the start (measured in seconds).
2. Wide jump test from stability to measure the explosive force of the two legs (measured in meters).
3. The stand and reach test to measure the flexibility of the trunk (measured in centimetres).

Research tool:

After approval was received by specialists, the construction evaluation form was designed on the degrees of the long jump four phases (see Appendix No. 1).

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Test homogeneity and equivalence

The researcher measured the following variables: age, length, body mass, jump, flexibility, 30-m running performance, and the technical performance of the long jump effectiveness. It became clear that there were no significant differences between the two groups in these variables before the educational program period (P>0.05), which indicates the existence of parity between the experimental and control groups. The researcher also found a normal distribution for the two study groups, as the values of the skewness ranged from 0.335-0.64, indicating normally distributed data.

Test Validity

Validity is one of the most important conditions for a good test. It indicates the extent to which the test (or any variable) achieves the purpose for which it was established, what the test measures, and to what extent it succeeds in measuring what it is intended to measure. The validity of the measure used in this study has been verified.

Table 1. Test validity

No.	Form	experimental group		Control group		Differences of means	T value	Eta 2	validity coefficients
		M	SD	M	SD				
1	Technical performance of long jump	36.450	3.894	26.850	2.217	2.217	2.217	0.824	0.908

Table 1 shows that there are statistically significant differences (P < 0.05) between the mean between the groups for evaluating the effectiveness of the technical performance of the long jump. It is clear that the form produced high effect size and validity coefficients.

Test Reliability

To evaluate the test's reliability, the researcher applied the scale on a sample of (15) students from the research community (but from outside the sample). The reliability of the test was verified by the Cronbach-Alpha equation, and the value of the reliability coefficient was (0.88), which is acceptable.

Table 2. Correlation coefficient between application and re-application to indicate the reliability coefficient for the evaluation form of technical performance effectiveness for the long jump under consideration

No.	Form	Applied		Re-applied		Correlation coefficient
		M	SD	M	SD	
1	Technical performance of long jump	31.650	4.963	32.900	3.746	0.963

Table 2 shows that there is a statistically significant correlation between the application and re-application of the technical performance effectiveness evaluation form for the long jump (P < 0.05), which indicates the stability of the form.

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Test Objectivity

The researcher verified the objectivity of the physical and kinetic tests by recording the results of three referees and then calculating the results. The degree of correlation was high (83%).

Pre-tests

The pre-tests were conducted for the research sample on Wednesday 11/12/2019 at 10:00 at the Al-Thawra Sports Club stadium, which includes measuring the apparent construction of the performance of the long jump. Participants were allowed to make (3) attempts, with the best trial considered as stated in international rules. Trials were recorded using video imaging, with a SONY camera positioned at an angle of 65 degrees. According to the opinion of the expert in sport biomechanical analysis[1*], the apparent structure of the students' performance was evaluated by the specialists[2**] and through indirect observations.

Data analysis

Statistical processing was done by using (SPSS for Windows, version 22.0, IBM Corp., Armonk, NY, USA). The percentage was calculated. Means, standard deviations, and correlation coefficients were also calculated. In addition to the "T" test, used to extract the statistical differences and the effects size, the interpreted inference magnitudes were considered as follows (Batter ham AM, Hopkins WG: 2006): < 0.2 = slight; 0.2–0.6 = small; 0.6–1.2 = moderate; 1.2–2.0 = large; 2.0–4.0 very large; and > 4.0 extremely large. Statistical significance of the results was accepted at $p < 0.05$.

Results

Table 3 shows the statistical significance of the differences ($P < 0.05$ was considered significant) between the pre and post-tests of the control group in the variable of the degrees of (technical performance) for the effectiveness of the long jump. Statistically significant differences were found in the post-test, as (T) achieved a value of (1.899), and an improvement percentage of (14.085%) was achieved. As shown in the table, the effect size achieved a value of (0.762), which indicates a moderate effect. This, in turn, indicates that the effectiveness of the traditional program is averaging on the dependent variable.

Table 3. The significance of the differences between the pre and post-tests of the control group in the variable degrees (technical performance) for long jump effectiveness

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No.	Variable	Pre-test		Posttest		Differences of means	Mean standard error	T value	Improvement percentage %	Effect size	Effect size sig.
		M	SD	M	SD						
1	Long jump Effectiveness	35.500	2.759	40.500	7.863	5.000	2.633	1.899	14.085	0.762	Medium

Table 4 shows the statistical significance of the differences (P < 0.05 was considered significant) between the pre and post-tests of the experimental group in the variable of the degrees of (technical performance) for the effectiveness of the long jump. Statistically significant differences are present in the post-test, as (T) achieved a value of (10.322), and an improvement percentage of (70.940%) was achieved. The table indicates that the effect size value is (3.283), which indicates a high effect, indicating the effectiveness of the traditional program is averaging on the dependent variable.

Table 4. The significance of the differences between the pre- and post-tests of the experimental group in the variable degrees (technical performance) for long jump effectiveness

No.	Variable	Pre-test		Posttest		Differences of means	Mean standard error	T value	improvement percentage %	Effect size	Effect size sig.
		M	SD	M	SD						
1	Long jump Effectiveness	35.100	3.247	60.000	5.594	24.900	2.412	10.322	70.940	3.283	high

Table 5 shows the statistical significance of the differences between the averages of the post-tests of the control and experimental groups in the variable of the degrees of (technical performance) in long jump effectiveness (P < 0.05 was considered significant). There are statistically significant differences in the post-test of the experimental group, as (T) achieved a value of (6,062), and the differences in percentage improvement ratios achieved a value of (56,856%). The table indicates that the value of the effect size was (2,480), which is high, thus indicating the effectiveness of the proposed program in terms of this variable, as the results strongly favour the experimental group.

Table 5. Significance levels of the mean differences in the post-tests and the effect of the variable on the degrees of (technical performance) for long jump effectiveness in the control and experimental groups.

No.	Variable	Control group		Experimental group		Differences of means	T value	improvement percentage differences	Effect size	Effect size sig.
		M	SD	M	SD					
1	Long jump Effectiveness	40.500	7.863	60.000	5.594	19.500	6.062	56.856	2.480	high

Discussion

The results indicated that there are statistically significant differences between the pre and post-tests of the control group in the variable of the degrees of (technical performance) for long jump effectiveness, as (T) achieved a value of (1.899), and a percentage improvement of (14.085%) was achieved (Table 3). The effect size was (0.762), which is moderate, thus indicating the effectiveness of the traditional program in an average manner

on the dependent variable. The size of the program's effect ranges from medium to high. Also, the progress that occurred in the pre- and post-tests of the control group of the technical performance form is attributed to the traditional method (explanation and model performance), which depends on the verbal explanation and the model's performance for the skill to be learned and the practice and repetition by the learner while correcting errors at the beginning of its occurrence, which led to the opportunity for the learner to learn the skill well(graham, 1995). This indicates the importance of using the traditional method (explanation and model performance) in a positive way to teach the correct artistic performance of sports activities and that collectively education through the method of explanation and presentation has motivational effects on students to compete among themselves. To show the superiority of each other, making them perform the skills in the best form of artistic performance. The repeated performance of the skill by the student, along with the teacher's continuous discovery and correction of mistakes, helped students to completely and properly learn the technical performance of the skill of the long jump. This was positively reflected in the level of technical performance and is consistent with the report of (Yerg & Twardy, 1982) showing that collective education employed through the method of explanation and presentation has motivational effects on students to compete with each other and highlight them outperform each other, thus making them perform the skills in the best form during artistic performances.

These implications verify the validity of the first hypothesis, which states that there are statistically significant differences between the means of pre- and post-tests in the variable of the technical performance of the event in favour of the post-test of the control group.

The results presented in Table 4 clarify that there are statistically significant differences between the pre and post-tests of the experimental group in the variable degrees of (technical performance) for long jump effectiveness ($P < 0.05$). It is also clear that there are statistically significant differences in favour of the post-test. (T) achieved a value of (10.322) and a percentage improvement of (70.940%). The effect size value was (3.283), indicating the high effectiveness of the proposed program on the dependent variable. The progress that occurred in the post-test of the technical performance form until the proposed program allowed the student to learn better, giving them the opportunity to innovate, which increases the self-motivation of learners while they practice this type of learning, as well as the resultant provision of the necessary feedback on an ongoing basis, which helps learners avoid mistakes.

The differentiated instruction model has benefits. For instance, it helps the student to replicate the skill and creates an educational atmosphere with which the learners interact, attract, and work with it and with things in it in a natural way(Council, 1998). The use of modern teaching methods in education has an important role in teaching athletic skills because of the self-learning provided to the student and the provision of the educational material in various forms, which helps to improve the level of technical performance. Moreover, the differentiated instructional strategy encourages teachers to respond to the needs of all learners and consider each student's readiness, interest, and capabilities in practice (Tomlinson C. , 1999). "Differentiation is achieved by teachers accommodating the varied needs and interests of their students in the development and administration of their lessons" (Peter , Andrew , & Ben , 2014).

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The rate of improvement in the form of technical performance achieved a value of (73.407%). The progress in the rate of change (percentage improvement) in relation to the level of the technical performance form in the post-test of the experimental group is attributed to the exchange of information and experiences between the learners and access to mastery of the effectiveness. These helped to produce learners from introversion and shyness, which might prevent some of them from asking a teacher questions, as these disappear with the colleague, which helps learners to increase their achievement at the skill level and allows for the possibility of conducting the experiment any number of times according to the learner's ability to comprehend at a suitable time. It also allows for the possibility of documenting the results of the experiments with the aim of analyzing them, treating them or sharing them with others, evaluating the performance of the learner and following up on his progress in conducting the experiment, adding the character of serious play in practice contributes to attracting the interest of learners and encourages their integration in the learning process. These factors were reflected positively on the level of the technical performance form. The overarching goal of differentiation is to maximize student growth and provide opportunities for optimal development for all students (Gower, 2010), (Hume, 2007). The results confirmed the improvement in the rates of change (the percentage of improvement) for students who studied according to the differentiated education strategy according to peer direction. Therefore, the results support the second hypothesis, which indicates that there are statistically significant differences between the means of the pre- and post-tests in the variant of the technical performance form for long jump effectiveness in favour of the post-test for students of the experimental group.

The results in Table 5 clarify that there are statistically significant differences between the averages of the post-test of the experimental and control groups in the variable degrees of the effectiveness of the long jump ($P < 0.05$). It is also evident that there are statistically significant differences in favour of the post-test of the experimental group, as (T) achieved a value of (6.062) and the differences in percentage improvement ratios achieved a value of (56.856%). It is clear from this table that the value of the effect size was (2,480), which indicates the high effectiveness of the proposed program. On this variable in favour of the experimental group over the control group, the progress that occurred in the post-test of the experimental group students in the form of technical performance on the students of the control group in the post-test is attributed to the fact that the proposed program worked on raising the motivation of learners and improving the quality of the educational process. This is because the problem requires the learners' thought and effort more than memorization, indoctrination, the development of higher thinking skills, and the exchange of information and experiences among learners in order to gain mastery of the skill to be learned as a result of stimulating their thinking positively. It also fosters discussion, communication, and organizing their ideas in a sequential manner, which helps them get and stay motivated and leads to an increase in their activity. These effects were reflected in the increased rate of improvement in the technical performance of the skill, which encourages their integration into the learning process. In turn, this effect reflected positively on the level of technical performance and the correct movement sequence. Thus, the findings support the third hypothesis, which states that there are statistically significant differences between the two tests of the experimental and control group students in the variable form of the technical

performance of the long jump effectiveness in favour of the post-test of the experimental group students.

There is a need to implement this educational program proposed by the teaching staff to teach the activities of athletics to students of the College of Physical Education due to its effectiveness of the results and its positive impact on the direct interaction between the student and the educational material. There is also a need for the appropriate employment of the new technologies in teaching courses related to athletics. Furthermore, teachers need to be instructed on the importance of using the proposed educational program in learning athletics skills. Similar studies should be conducted using the proposed program to prove its effectiveness on samples from different stages and on other variables and other sports activities.

Conclusion

The traditional method improved the level of technical performance of long jump effectiveness in the control group. In addition, the experimental group outperformed the control group, which indicates the effectiveness of the Differentiated Instruction Strategy in learning the skills that were taught.

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