Effect of Keller and Self-Learning Strategies on Learning Low Start Skill of Short-Distance Sprint For Students

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Abstract
Objectives. The study aimed to develop educational units using Keller's strategies and self-learning methods to teach the low start technique in short-distance running to students. Additionally, the research sought to identify the effectiveness of Keller's self-learning strategy in enhancing students' learning of the low start skill in short-distance running.   **Materials and Methods.** The researchers adopted an experimental approach appropriate to the study's nature. The research design included two experimental groups and one control group, with pre- and post-tests conducted to measure the outcomes. The study population comprised first-stage students from the College of Physical Education and Sports Sciences at the University of Maysan for the academic year 2024-2025, totaling 132 students. From this population, a sample of 90 students was randomly selected through the lottery method, representing 68.16% of the total population. The educational program spanned two weeks and consisted of four educational units, with two sessions per week. Each educational unit lasted 90 minutes, in alignment with the scheduled lesson times.   **Results.** The findings of the study demonstrated that Keller's self-learning strategy effectively improved students' performance in the low start technique for short-distance running. The experimental groups that participated in the educational program using Keller's strategies showed a noticeable enhancement in their skill acquisition compared to the control group.   **Conclusion.** The study concluded that Keller's self-learning strategy is beneficial in teaching the low start skill in short-distance running. It is recommended to generalize the application of this strategy for students in the Faculty of Physical Education and Sports Sciences to improve their practical skills in athletics.
Keywords: Keller Strategy, Self-Learning Strategy, Short-Distance, Sprint, Students.

Introduction

One of the characteristics of the current era is the rapid development that has included all fields of science, including the fields of physical education and sports sciences in general and the field of teaching strategies and methods in particular to achieve better and faster learning, as the physical education teacher faces many difficulties that may hinder the teaching process, including diversity and difference in the low starting skill of running short distances, in addition to the necessity of his students' good knowledge of the theoretical and practical aspects related to the performance of each skill and effectiveness within the time available for the school year.

Here comes the importance of Keller's strategy to make it the application of the program, as it is one of the strategies that takes into account individual differences among learners, in terms of presenting the material in the form of short units and specific behavioral goals and providing feedback that enhances the role of the learner, and following up on these situations in order to reach specific teaching goals. And the self-learning strategy, where it is necessary to teach students self-learning skills that enable them to learn and help them employ the learning and knowledge resources available in the surrounding environment, as self-learning "is the intended procedural process in which the learner tries to acquire by himself the sufficient amount of knowledge, concepts, skills, attitudes and values through the practices and skills determined by the program in his hands through technological applications" (6-62).

The beginnings in short-distance running have existed since the beginning of the ancient Olympic Games, and the competitor used to stand behind the starting line so that the upper part on one side was bent forward and one foot was in front of the other. The ancient competitors used the tight rope by placing it in front of the competitors on one line, as well as working to provide justice and equality at the beginning, as the starting signal at that time was the rope falling to the ground. The importance of the research lies in preparing educational units in learning the low start for short-distance running using the Keller and self-learning strategies for first-stage students.

Research problem is through the researchers' knowledge and experience of the method and style in which the skill of low start for short-distance running is learned, since the researchers are national team players and teachers for this activity, they noticed the reliance on traditional methods, in which the role of the learner is limited, and that the method followed is the imperative method that hinders the development of the elements of discovery and innovation according to the limits of the researcher's knowledge. Also, the skill of low

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start for short-distance running differs from the rest of the skills and activities taught in college in that the learner rarely practices it outside the framework of study, and this in itself is a problem in terms of the lack of information and knowledge about the skill for the learner, which requires a new program based on a strategy that makes learning more clear and appropriate to his individual abilities. It is clear from this that the traditional method followed is not suitable for all learners, so the researcher decided to add two strategies that work to move the learner in the educational unit so as to reach a high level of mastery.

Research objectives included Preparing educational units using the Keller and self-learning strategies to teach the skill of low start for short-distance running for students. And identify the effect of Keller's self-learning strategy in learning the low start skill for short-distance running for students.

Research hypotheses included there are statistically significant differences between the results of the pre- and post-tests of the three research groups in learning the low start skill for short-distance running for students. And there are statistically significant differences between the results of the post-tests of the three research groups in learning the low start skill for short-distance running for students.

Materials and Methods
Study participant

The study population consisted of first-stage students from the Department of Applied Sciences at the College of Physical Education and Sports Sciences, University of Maysan, during the academic year 2024–2025. The total number of students was 132. After excluding participants from the exploratory experiment, instructors, individuals practicing athletics, and absentees, the researchers deliberately selected a primary study sample of 90 students, representing 68.16% of the total population. These participants were randomly divided into three groups: two experimental groups and one control group. Prior to implementing the educational curriculum based on Keller's strategy and self-learning strategies, the researchers conducted a homogeneity check on the sample. This was done by measuring several anthropometric variables, including height, body mass, and age, as shown in Table 1.

Table 1. Homogeneity of the research sample in anthropometric variables

Variable	Measure Unit	N	Mean	Median	Standard Deviation	Coefficient of Skewness
Height	cm	90	170.70	169.60	5.344	0.617
Mass	Kg	90	72.47	73.60	4.478	-0.757
Age	year	90	19.93	19.88	0.740	0.202

The skewness coefficients for all variables were within the acceptable range (±1), indicating the homogeneity and normal distribution of the study participants regarding these variables.

Study Organization

The researchers employed an experimental research design consisting of two experimental groups and one control group. The experimental groups were subjected to different instructional strategies—Keller's personalized system of instruction for the first experimental group, and a self-learning strategy for the second group. The control group continued with the traditional teaching method applied by the course instructor.

Before beginning the main experiment, an exploratory study was conducted on 12/1/2024 with a sample of 10 students (excluded from the main study sample). The aim was to ensure the efficiency of the support team, check the readiness of the tools and equipment, and confirm the feasibility of the research design and implementation procedures.

Additionally, an introductory unit was delivered on 12/5/2024 to familiarize students with the low start skill in short-distance running. Pre-tests were administered on 12/8/2024 under standardized conditions to evaluate the participants' baseline performance.

The educational intervention was implemented over a period of two weeks, from 12/12/2024 to 22/12/2024, with two educational units delivered per week for a total of four sessions. Each session lasted 90 minutes. The control group received instruction using the conventional method, while the experimental groups followed their respective instructional strategies.

Structure of the Educational Units:

1. **Preparatory Part** (20 minutes): Attendance (3 min), general physical preparation (7 min), and specific preparation exercises (10 min).

2. **Main Part** (65 minutes): Educational activity (10 min) and applied practice (55 min).

3. **Conclusion** (5 minutes): Light jogging, relaxation, and cool-down exercises.

   The Keller strategy was applied in alignment with its reference framework, emphasizing student-paced progression and mastery learning. Meanwhile, the self-learning strategy was tailored to accommodate individual differences, offering various learning media such as printed images with descriptive texts and videos with slow-motion replay, accessible via CDs for students to review independently.

   Post-tests were conducted on 12/26/2024, using the same conditions and procedures as the pre-tests to ensure consistency.

Statistical Analysis

The data collected from the pre-tests and post-tests were analyzed using the Statistical Package for the Social Sciences (SPSS), version 24. Descriptive statistics such as arithmetic

means, standard deviations, and skewness coefficients were calculated to describe and assess the homogeneity of the research sample.

To determine the reliability, validity, and objectivity of the Low Start Skill Test for Short-Distance Running, the following analyses were performed:

1. **Objectivity**: A coefficient of 0.936 (p = 0.002) was obtained using Pearson's correlation between two judges.
2. **Reliability**: A coefficient of 0.955 (p = 0.000) was established through a test-retest method conducted on the exploratory sample after seven days.
3. **Self-validity**: Calculated using the square root of the reliability coefficient, resulting in 0.977.

Table 2. Scientific bases of the Low Start Skill Test

Test Name	Objectivity Coefficient	Reliability Coefficient	Self-Validity
Low Start for Short Distance Running	0.936 (p = 0.002)	0.955 (p = 0.000)	0.977

Inferential statistical methods included:

1. **Pearson's correlation coefficient** to determine relationships between variables.
2. **One-way ANOVA (F-test)** to assess differences among the three study groups.
3. **T-test for correlated samples** to analyze within-group pre- and post-test differences.
4. **Least Significant Difference (LSD) test** for post-hoc comparisons.

These analyses allowed the researchers to evaluate the impact of the instructional strategies on students' learning outcomes in the low start technique for short-distance running.

Results

Presentation and analysis of the results of the pre- and post-tests of low start for short-distance running for the three research groups and their analysis:

Table 3. Shows The Results Of The (T-Test) Test For The Correlated Samples Of The Three Research Groups In The Pre- And Post-Tests For Learning The Skill Of Low Start For Short-Distance Running For Students

Skill,	groups	No.	Pre-test		Post-test		F	Calculated (t)	Sig. level
			Mean	St.d	Mean	St.d			
Low start for	1	30	3.07	0.640	6.67	0.711	0.175	20.614	Insig.
	2	30	2.70	0.837	6.87	0.860	0.219	19.017	Insig.

short distance running	3	30	3.17	0.747	5.53	0.571	0.172	13.788	Insig.

It is noted from Table (3) that the value of calculated (t-test) for the related samples reached (20.614) with a (Sig) degree of (0.000) > (0.05) at a significance level of (0.05), which means the statistical difference is significant in favor of the results of the post-test. As for the second experimental group (self-learning strategy), its arithmetic mean and standard deviation before was (2.70, 0.837) and after became (6.87, 0.860), with the average and deviation of the differences between the results of the two tests (4.167, 0.219), and the value of (t-test) calculated for the related samples (19.017) with a (Sig) degree of (0.000) > (0.05) at a significance level of (0.05), which means that the statistical difference is significant in favor of the post-test results. As for the third group (control), its arithmetic mean and standard deviation before (3.17, 0.747) and after it became (5.53, 0.571), with the average and deviation of the differences between the results of the two tests (2.367, 0.172). The value of (t-test) calculated for the related samples reached (13.788) with a (Sig) degree of (0.000) > (0.05) at a significance level of (0.05), which means that the statistical difference is significant in favor of the post-test results.

Table 4. Shows The Results Of (F) One-Way Analysis Of Variance Between The Three Research Groups In The Low Start Skill Test For Short-Distance Sprinting

Tests	N	State	Sum of square	Sum of differences	Mean square	F	Sig.	Sig. level
Low Start for Short Distance Runing	30	Between groups	31.022	2	15.511	29.594	0.000	Sig.
		Within groups	45.600	87	0.524			

Table (4) shows that the calculated (F) value (29.594) among the results of the three research groups (the two experimental groups and the control group) in the post-test of low start for short-distance running was statistically significant when compared to the (Sig) score at a significance level of (0.05) anA34saed two degrees of freedom (2-24) which reached (0.000) > (0.05).

Table 5. Shows The Results Of The (LSD) Test Among The Three Research Groups In The Post-Test Of Low Start Skill For Short-Distance Running.

Low Start Test	Groups	Mean differences results	(Sig)	Significance
Low Start for Sprinting	1 - 2	0.200	0.288	There are no significant differences between the first group (Keller's strategy) and the second group (self-learning strategy)
	1 – 3	1.133	0.000	Significant in favor of the first experimental group (Keller's strategy)
	2 – 3	1.333	0.000	Significant in favor of the second experimental group (self-learning strategy)

From observing Table (5), it is clear that the differences between the post-arithmetic means of the three research groups (the two experimental groups and the control group) were extracted, as in the low start test for short-distance running, the values of the (Sig) score were > (0.05) and are significant at a significance level of (0.05), and that the difference in the arithmetic means was in favor of the first experimental group (Keller strategy) and the second (self-learning) which were equal, followed by the third group (control).

Discussion

Discussion of the results of the low start for short-distance running for the pre- and post-tests for each of the three research groups.

First: The first experimental group (Keller's strategy) By presenting and analyzing the results of the pre- and post-tests for the low start of short-distance running, and through tables (5), it was shown that there is a significant difference between the pre- and post-tests of the experimental group in favor of the post-tests. The researchers attribute this improvement in the post-test to the fact that adopting the Keller strategy has a clear effect on the learning process, because this strategy helped students understand the content of the educational material well through the steps on which this strategy was built. Also, the strategy that the researchers worked on worked to reduce individual differences between them, by providing sufficient time for learners, as this strategy depends on giving the student sufficient time to learn according to the level of each one of them, thus achieving the maximum degree of good management of the lesson, with management that gives the learner the right to choose the appropriate time to some extent, as Jaber Abdul Hamid and others mention "providing the maximum degree of freedom so that they do what they want to do whenever they want, as in

this atmosphere of freedom the natural growth of learners is achieved" (3-311), i.e. learning according to their own abilities, in addition to organizing the information given to the student and providing the guide Educational, printed paper, and electronic presentation of educational material. This comes in the section on the diversity of ways to learn, where Tawfiq Mar'i and Muhammad Al-Hila mention in the diversity of ways to learn in Keller's strategy "the possibility of adopting different ways that enable the individual to master his learning, whether they are library, guidance, audio-visual means, or other, as the final criterion for success is passing the specified level of mastery of the unit regardless of the time and effort expended" (2-2681). This is what the researchers worked on through the educational curriculum, by giving the student sufficient opportunity to choose what suits his speed of understanding the information and the appropriate means to achieve that.

Second: The second experimental group (self-learning strategy): - Referring to the results of Table (5), it is clear that the students of this group have a clear improvement in learning both the low start of short-distance running over the students of the control group. The researchers attribute the emergence of these results to their application of the self-learning strategy in teaching this skill, which took into account the preparation of its exercises in a manner consistent with the determinants of this strategy and providing its requirements for presenting the model in a manner that suits the individual differences of the students. This clarity helped increase the student's ability to bear responsibility for performance in light of the information he absorbs regarding organizing his performance and monitoring his transition in progress through moving from one stage to another in acquiring this learning. In this regard, (White, Rodney M) states that "within the framework of active learning, learners carry out several activities, such as imposing hypotheses, interpreting, justifying, solving problems, following up on current events, and benefiting from them in their practical life applications. Thus, they become independent, self-reliant learners who are able to understand the things and people they interact with in different situations." (9-305/306), and also "learning is affected by the content of the educational medium and the teaching method used in it more than it is affected by the type of medium itself" (10-1889).

Third: The third group (control) From reviewing the aforementioned results, it is clear that the students of the control group improved their learning of each of the low start for short-distance running, and the researchers attribute this, despite the fact that the students of this group did not apply any of the two experimental strategies in this study, to the method followed by the subject teacher and his being a specialist in this game, and that this method left an impact on the students who learned according to the teacher's method followed, which

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helped them learn according to the curriculum approved by the college.

Conclusion

In light of the findings of the current study, the researchers reached several important conclusions. First, teaching using both the Keller strategy and the self-learning approach significantly contributed to the students' ability to learn the low start technique for short-distance running. The educational curricula prepared according to these strategies proved more effective, as students in the experimental groups outperformed those in the control group who were taught using traditional methods by the subject teacher. Second, the application of Keller's strategy and self-learning methods fostered a positive, effective, and active learning environment.

These approaches encouraged student participation in discussions and the exchange of information, which in turn enhanced their learning acquisition processes and improved their ability to retain information over time. Third, the study demonstrated that these teaching methods instilled enthusiasm and vitality among the students. They fostered a spirit of cooperation and increased the students' motivation to engage in lesson activities. This heightened level of participation had a positive impact not only on their understanding of the subject matter but also on their ability to retain and apply the learned skills in practice.

Recommendations

Based on the conclusions drawn from this study, the researchers proposed a set of recommendations to enhance the teaching and learning process in physical education, particularly for the low start technique in short-distance running.

Firstly, it is recommended that the results of this study be generalized and applied to other students of the College of Physical Education and Sports Sciences, especially in teaching the low start technique for short-distance events.

Secondly, there is a need to adopt Keller's strategy and the self-learning approach more widely in the curriculum of Colleges of Physical Education and Sports Sciences, particularly in teaching short-distance running skills. These strategies have proven effective in developing technical skills and enhancing student learning outcomes.

Thirdly, the study emphasizes the importance of utilizing modern teaching aids, such as visual models, videos, and multimedia tools, to support the teaching of sports skills and activities. These tools can greatly enhance students' understanding and execution of complex movements.

Additionally, the researchers recommend conducting similar studies on other track and field activities to validate the effectiveness of these strategies in different sports contexts.

Lastly, they suggest expanding the scope of future research to include other sports and physical activities, in order to explore the broader applicability and benefits of Keller's strategy and self-learning approaches in various athletic disciplines.

References

1-Amin Ali Muhammad Suleiman and Raja Mahmoud Abu Alam: Measurement and Evaluation in the Humanities, its Foundations, Tools and Applications, 2nd ed., Cairo, Dar Al-Kitab Al-Hadith, 2012.

2-Tawfiq Ahmad Mari and Muhammad Mahmoud Al-Hila: The Effect of the Keller Plan on the Achievement of Tenth Grade Students in the Irbid Educational District, Journal of Humanities Studies, Issue 6, Volume 22, 1995.

3-Jaber Abdul Hamid Jaber and others: Teaching Skills, 1st ed., Dar Al-Nahda Al-Arabiya, 1985.

4-Rahim Younis Kro: Introduction to the Scientific Research Methodology, Dar Dijlah, Amman, 2008.

5-Saeed Jassim Al-Asadi and Sundus Aziz Faris: Statistical Methods in Research for Educational, Psychological, Social, Administrative and Scientific Sciences, Amman, Safa Publishing and Distribution House, 2014.

6-Talat Mansour: Self-Learning and Personality Development, 1st ed., Anglo-Egyptian Mekkah, Cairo, 1977.

7-Muhammad Hassan Alawi and Muhammad Nasr al-Din Radwan: Measurement in Physical Education and Sports Psychology, Dar al-Fikr al-Arabi, Cairo, 2008.

8-Muhammad Khalil Abbas and others: Introduction to Research Methods in Education and Psychology, Amman, Dar al-Masirah, 2011.

9- White, Rodney M ; An Alternative Approach to Teaching History .On Teaching ; OAH Magazine of History,V.8,N.2, 1994.

10-Zaydon J. Mohammed (And others): The effect of Lactate threshold Training on improving the Functionality of the lungs, Journal Of Human And Exercise , V14, N 5, 2019.

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مكونات اللياقة الصحية والحركية لدى المتدربات باعمار 30 – 39 سنة ", Modern Sport, 2023
Publication

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Publication
  1 %

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  <1 %

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  <1 %

Publication

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