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Impact of the Flipped Learning Strategy on Long Jump Skill Learning Performance in Physical Education and Sport Sciences Students

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Abstract

The present study aimed to investigate the effect of the flipped learning strategy on improving long jump learning performance among students of the College of Physical Education and Sport Sciences. An experimental research design based on equivalent groups with pre- and post-testing was employed. The study sample consisted of 30 first-year students who were randomly assigned into an experimental group (n = 15), which received instruction using the flipped learning strategy, and a control group (n = 15), which followed the traditional teaching method. The instructional program was implemented over four weeks, comprising eight educational units with a duration of 90 minutes per session. Long jump learning performance was evaluated using a technical skill assessment form covering the main performance phases, including approach, take-off, flight, and landing. The results were analyzed using descriptive statistics and t-tests for dependent and independent samples at a significance level of ($p \leq 0.05$). The findings revealed significant improvements in both groups, with superior learning performance observed in favor of the experimental group. The flipped learning strategy enhanced students' engagement, provided prior cognitive preparation, and increased effective practice time, which contributed to improved motor skill acquisition. The study concludes that integrating flipped learning into physical education instruction represents an effective pedagogical approach for enhancing athletic skill learning outcomes among university students.

Keywords: motor skills, learning, physical education and training, students, flipped learning

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Introduction

The rapid evolution of teaching and learning technologies has also had a transformative impact on pedagogical strategies in physical education such that broadening opportunities for active participation, skill retention, and transfer have shifted learning contexts from teacher-driven paradigms to learner-focused frameworks. Modern teaching techniques are designed to help learners make the most out of study opportunities—integrating digital technologies enables students to connect with learning outside of schools. A currently popular approach is the flipped learning model, which alters traditional teaching roles by moving theory–based instruction out of the classroom and devoting class time to hands-on application with performance improvement.

Deep physical education skills learning takes generally a lot of practice time, continuous feedback, and active learner involvement. Motor practice has been limited during higher education courses by traditional teaching methodologies that often rely too heavily on instructional explanation. To overcome these limitations, the flipped learning model allows students to receive instructional coverage from educational material preview outside of class, transferring practical sessions to focus on motor execution and corrective feedback (Bergmann & Sams, 2023; Bishop & Verleger, 2013).

Previous educational research has demonstrated that flipped learning enhances student motivation, autonomy, and performance outcomes across various learning contexts. Studies also confirmed its effectiveness in improving psychomotor skills through increased engagement and individualized learning pacing (O'Flaherty & Phillips, 2015; Al-Maroof & Al-Emran, 2021). Moreover, integrating digital learning environments contributes to deeper understanding and better retention of motor skills in sports education settings (Chen et al., 2014; Waleed Abdulkareem & Sattar Jabbar, 2025).

Learning motor skills in athletic events such as the long jump is largely dependent on the coupling of biomechanics that relate to speed, strength, balance, and timing. This means that if we want the learner to properly acquire the different phases of movement—approach, takeoff, flight & landing—effective teaching strategies become paramount. Modern motor learning theory advocates that interpersonal engagement of the learner in practice and feedback-based correction are critical requirements for mastering a skill (Schmidt & Lee, 2025; Abdulghani et al., 2025).

The latest recent studies show movement education needs to be done through blended and tech-supported models. This flipped learning approach, in which theory and visual demonstrations were delivered to students before the practice sessions, has been found useful to prepare them cognitively and improve their procedural execution during class activities (Abeysekera & Dawson, 2015). As mentioned in research (Gilboy et al., 2015; Hassan & Abdulkareem, 2026), despite being newer, the participants that were exposed through flipped instruction had higher levels of engagement and outperformed traditional instructional methods.

In addition, researchers from physical education have emphasized that more practical time spent in lessons promotes neuromuscular adaptation and the development of motor coordination (Everett et al., 2013; Abdulghani & Hussain, 2025). The flipped method facilitates self-paced learning, where students can go through instructional materials over and over which enhances

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accuracy of skill acquisition as well as consistency in performance (Hew & Lo, 2018; Hassan & Abdulkareem, 2025).

Despite growing international adoption of flipped learning, its application in athletics skill learning within physical education colleges remains limited, particularly in teaching long jump performance skills among university students.

However, the teaching methods of athletic skills in colleges of physical education are mainly through traditional conceptual instruction and classroom explanation to practical operation (including technical demonstration). In this mode, the students have limited time for application, which leads to difficulties in training. This paradigm may limit students' chances for repeated performance and faculty feedback tailored to individual circumstances—both necessary elements in the learning of motor skills like the long jump. Many students, as a result, have poor technical performance levels despite being regularly taught. Hence, the research problem is to determine whether implementation of the flipped learning strategy enhances long jump learning achievement compared to conventional teaching methods.

The present study aims to identify the effect of using the flipped learning strategy on improving the level of long jump learning performance among students of the College of Physical Education and Sport Sciences by comparing the learning outcomes of students taught using flipped learning with those taught through the traditional instructional method.

It is hypothesized that there are statistically significant differences between the pre- and post-tests in favor of the post-test for both groups, as well as statistically significant differences in the post-test results between the experimental and control groups in favor of the experimental group that used the flipped learning strategy in learning long jump performance.

This research has been significant because it proposes a current pedagogical method used in the teaching of athletics associated with technological learning and motor experience. This study promotes more efficient learning in physical education by increasing the time spent practicing, enhancing student engagement with their task, and enabling self-directed learning. It also provides scientific data about the effectiveness of flipped learning to the instructors and curriculum designers for developing skill performance in participating athletes, especially in the context of long jump learning among university students.

Methodology

Research Design

The current research was conducted using an experimental type of research design, adopting the equivalent groups of pre-test and post-test model to identify the impact of the implementation of the flipped learning strategy on students' level of long jump learning performance. This design was utilized so that the researcher could investigate the direct impact of the instructional strategy by comparing performance gains due to an educational intervention in a controlled environment.

For the purpose of this study, participants were divided into two equal groups. For the experimental group, teaching was done with a flipped learning strategy, using the reversed sequence of introduction and application of knowledge (the students are firstly exposed to educational resources before lessons in order to use classroom time primarily for exercising

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practical performances). On the other hand, the attendance control group was taught in a similar traditional teaching method as one of the frequently used methods for athletics lessons, which emphasizes explanation and demonstration during classroom time and practice.

Both groups were delivered identical educational content directly related to long jump skills, and both groups were taught over the same instructional period. An identical testing protocol as well as comparable environmental conditions were used across groups during both the pre-test, administered prior to study implementation of the instructional program, and the post-test after completion of the intervention. By doing this, it made sure that any difference observed in terms of performance was due to the teaching strategy used alone and not to other external variables.

Participants

This study's research population included first-year students at the College of Physical Education and Sport Sciences in practical athletics classes during the academic year. From this population, a convenience sample of thirty students was selected that were appropriate to the study and are learning basic athletic skills such as the long jump.

After choosing the participants, they were randomly divided into two equal groups to prevent bias. So the first group was experimental group that consists of 15 students learning with flipped learning strategy, and second one was control one which also consist of 15 students only whom being taught by regular teaching method.

Before implementing the instructional program, each participant was checked by the researcher to ensure all were physically able to complete the required activities. Thus, students with injuries or any medical conditions that could affect physical performance were excluded. Moreover, none of the participants had ever received specialized training in long jump skills to ensure that students performed at a similar level before running the experiment.

In order to hold the experimental and control groups statistically equivalent prior to the administration of the instructional program, both groups were assessed for long jump skill performance under uniform testing conditions with a pre-test. To establish the existence of significant differences at the baseline level between the two groups, statistical analysis was conducted on pre-test results using independent sample t-test. The analysis reported no statistically significant differences $p > 0.05$ between groups at the pre-test measuring level of long jump skill performance which confirmed that experimental and control groups were equivalent on this measure prior to the start of the experimental intervention (see table1). This equivalence guaranteed that any differences detected in the post-test were related to the instructional strategy used rather than initial performance differences.

Table 1. Independent Sample t-Test for Pre-Test Differences Between Groups

Variable	Group	Mean	Std. Deviation	t-value	Sig. (p)
Long Jump Skill Performance	Experimental	9.47	1.12	0.21	0.835
	Control	9.39	1.08		

Instructional Program

The teaching intervention was conducted in the course of four successive weeks according to the dates of athletics practical lessons as organized by College of Physical Education and Sport

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Sciences. The educational program was meticulously structured to allow ample learning time during the experimental duration while gradually enhancing skill acquisition.

There were two instructional sessions per week on Sunday and Thursday, leading to a total of eight educational units delivered throughout the experiment. Each instructional unit was around 90 minutes long to allow ample time for skill explanation, on-ice practice, performance repetition, and feedback.

Both experimental and control groups were exposed to the same educational content related to technical phases in long jump performance (approach run, takeoff, flight, and landing). However, the difference between both the groups lay in the teaching methodology and technique used during instruction. In the experimental group, its flipped learning strategy was employed; on the contrary, in the control class, the conventional teaching method was used. This would allow variation in learning outcomes to be causally attributed, as appropriate, to the course being taught and not interactively or passively delivered content or duration of training sessions.

Implementation of the Flipped Learning Strategy

In this study, the flipped learning strategy was used intentionally based on the sequential stages of learning, which can enhance both students' cognitive understanding and practical performance skills in long jump. Before attending instructional sessions, the experimental group was provided educational materials (demonstration videos and model displays as well as physical/theoretical analysis of general stages (approach run, take-off, flight phase, and landing phases) of long jump skill performance. The content was provided via its digital channels, allowing the students to study and get a first overview before it would be applied in practice.

In class time, only practical performance related to instruction activities happened instead of any theoretical elaboration. The students would have practiced their skills repeatedly, involved in collaborative group learning opportunities and guided practice with the instructor. This method freed up lesson time for motor performance and also allowed the instructor to see individual performances closely enough to provide instant corrective feedback.

During the instructional program, students were given ongoing feedback and assessed on their performance to improve movement accuracy and technical execution. Moreover, the steady correction process argument helped in strengthening proper motor patterns and sustaining a better acquisition of long jump learning performance by collecting active engagement and continued practice.

Control group received education with common teaching method which is usually implemented in the field of athletics. In this method, the teacher used class time to provide verbal descriptions of the long-jump skill with a practical demonstration demonstrating how each technical phase of the skill should be performed. Students worked on the skill in a controlled fashion under the guidance of the instructor after watching a demonstration.

In the practice phase, participants practiced the long jump as instructed on presented slides while a trainer observed performance and gave instant corrective feedback. This conventional model of explanation and demonstration within the classroom, followed by performance practice represents the most frequently shared instructional approach in physical education lesson delivery.

Measurement Tools and Tests

A long jump learning performance was assessed to evaluate whether a technical skill performance evaluation helps measure the student's learning level in the long jump event. The bones of the evaluation were about the four sequential main technical phases of skill: approach run, take-off, flight, and landing that reflect biomechanical basis unlike long jump's kinematics (Subiyanto, 2023; Wei et al., 2021).

A standardized evaluation form based on athletic teaching protocols was developed, and performance assessments were recorded during testing sessions. A panel of qualified experts in the fields of sports and motor learning evaluated each contestant's performance to ensure an objective assessment.

Each phase of the long jump skill was assigned a score so that the sum of performance scores could show how well each student performed these skills. All subjects made 3 attempts and selected the best performance for evaluation and statistical analysis.

Table 2. Long Jump Skill Performance Evaluation Criteria

No.	Skill Phase	Technical Performance Indicators	Score
1	Approach Run	Gradual acceleration, rhythmic steps, maintaining body balance and correct running path	5
2	Take-off	Proper foot placement on take-off board, knee extension, arm swing coordination, vertical lift	5
3	Flight Phase	Body control in air, maintaining balance, correct leg positioning	5
4	Landing	Forward leg extension, trunk flexion forward, safe and balanced landing	5
Total Score			**20 Marks**

Validity and Reliability

The long jump skill performance evaluation form content validity. Selection criteria were adapted from scientific references in teaching of athletics and principles of motor learning literature directed on phases of long jump performance. Then, subsequent to its development, the evaluation form was administered to a panel of experts in athletics, motor learning and pedagogical approaches in physical education to assess appropriateness for use within diagnostic measures of learning performance in long jump.

Performance indicators relating to clarity, relevance and comprehensiveness were assigned to the technical-historical phases of long jump discussed (approach run, takeoff, flight and landing) as well. These were then refined according to their recommendations, making some minor changes to increase the accuracy and clarity of the assessment criteria. The assessment should cover the actual designed learning outcomes, which is validated by the consistency between experts in determining and evaluating it.

The test-retest method was used to evaluate the reliability of the evaluation form, thus making sure of the measurement consistency. The long jump skill was performed by a pilot sample drawn from students not included in the main research sample under similar testing conditions on two occasions, separated by a week.

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The same scoring protocols and expert evaluators were used to score performances. The intraclass correlation coefficient was used to calculate the correlation between the scores for the first and second measurements, with Pearson's relationship coefficient showing a high degree of consistency between scores ($r = 0.80$), which shows that this evaluation form has an acceptable level of reliability in measuring long jump learning performance.

Moreover, the inter-rater reliability was ensured by reaching an agreement on evaluators' scores and calculating for each participant male the mean of the evaluators' ratings as a final performance score to minimize subjective bias.

Testing Procedures

Video recording was used to record students' performances during the testing sessions to provide accurate observation. Three experts in athletics and motor learning judged the recorded performances. Each expert alone evaluated the technical performance based on an evaluation form.

The final performance score of each student was calculated through the arithmetic mean of evaluators' scores so as to ensure objectivity and reduce biases in individual judgment.

All participants performed three trials, and one was selected per subject for evaluation and statistical analysis.

Experimental Procedures

The process adopted to conduct the initial experiment is as follows. First, pre-tests were conducted for both the experimental and control groups in a similar environmental and organizational context. All subjects were provided the same facilities, equipment, timing & evaluation procedures in order to ensure a fair experiment and establish baseline measurements of long jump skills performance prior to the implementation of the instructional intervention.

After pre testing, the instructional program was subsequently implemented over four consecutive weeks as originally planned. In this phase, the experimental group was instructed by using a flipped learning strategy while the control group was instructed through traditional teaching method. To control for learning conditions, both groups were presented with the same educational material and received an equal amount of instructional time.

Post-tests for both groups were then conducted following the same testing procedures, evaluation criteria and performance conditions used in pre-tests after the instructional program. Given that pre- and post-test scores were obtained under the same circumstances, this confirmed that differences observed between test results before versus after instruction were due in fact to strategy rather than changes in testing conditions.

Finally, all collected data were carefully recorded, organized, and prepared for statistical analysis in order to determine the significance of differences within and between the two groups.

Statistical Analysis

Analyses were performed in SPSS V. 26 to determine within and between study group differences. To describe the performance levels, mean and standard deviation were calculated for pre- and post-tests; whereas paired sample t-test was used to compare pre- and post-test findings within group. Also, independent sample t-test was used in order to compare post-test scores of experimental and control groups to identify impact of flipped learning strategy. Statistical significance was determined by $p \leq 0.05$.

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Results

Table 3. Comparison Between Pre- and Post-Test Results for the Experimental Group

Test	N	Mean	Std. Deviation	t-value	Sig. (p)
Pre-Test	15	9.47	1.12	9.86	0.000*
Post-Test	15	16.82	1.03		

* Significant at ($p \leq 0.05$)

Table 4. Comparison Between Pre- and Post-Test Results for the Control Group

Test	N	Mean	Std. Deviation	t-value	Sig. (p)
Pre-Test	15	9.39	1.08	4.12	0.001*
Post-Test	15	12.74	1.26		

* Significant at ($p \leq 0.05$)

Table 5. Independent Sample t-Test for Post-Test Differences Between Experimental and Control Groups

Variable	Group	Mean	Std. Deviation	t-value	Sig. (p)
Long Jump Skill Performance	Experimental	16.82	1.03	8.21	0.000*
	Control	12.74	1.26		

* Significant at ($p \leq 0.05$)

Discussion

The results of the current study showed that both teaching methods promoted long jump performance learning, but flipped learning instruction was more effective than traditional teaching method. The evolution within the experimental group is likely due to flipped learning, which readjusts the balance of in-class and out-of-class teaching time, shifting theoretical instruction away from a traditional didactic model towards more active motor practice with performance feedback.

From the motor learning perspective, practice randomization leads learners to do better during skill acquisition when they are given multiple opportunities to execute along with constant feedback and error correction. The flipped learning model meant that students came to practical sessions already cognizant of the phases of movement and so were able to engage at a deeper level in executing skills, moving more quickly from an understanding cognitively to stabilization of motor performance. New findings have demonstrated that as compared to traditional instructional models, flipped classrooms experience significantly improved motor skill acquisition and cognitive–motor integration in university students (Liu et al., 2025; Abdulkareem & Hassan, 2025).

In addition, one of the main reasons why the experimental group is superior to the control group may be attributed to learner autonomy and active learning abilities that were fostered by digital pre-class learning. This makes sense because when students have taken the time to go back and review their instructional videos many times before practice, they create better cognitive representations of the movement patterns that develop coordination during performance and technical accuracy. In physical education contexts, findings corroborating this trend also came to light: That technology-supported flipped learning increased the quality and accuracy of skill execution helped by improved learner engagement and opportunities for reflection (Lin et al., 2022; Abdulhussein et al., 2026).

While the control group did have some improvement, that won't be a surprise in motor learning situations where practice and instructor feedback exist. High-impact learning does occur in conventional fashion through demonstration and repetition, although these traditional methods of delivery afford less opportunity for active practice during an explanation of the material when done in class. Utilizing flipped learning strategies resulted in significantly higher levels of skill acquisition in experimental studies conducted in university physical education classes, which were already reported greater performance improvements when only receiving traditionally taught blocks as part of a lecture (Fathel, 2025; Jdaitawi, 2019).

Another significant rationale is motivational and psychological factors in flipped learning environments. Studies have shown that flipped instruction has positive effects on students' intrinsic motivation, self-efficacy, and learning satisfaction (Wu et al., 2025; Salman & Taha, 2024), which are strongly associated with persistence during practice of motor skills and better performance outcomes. Such increased motivation possibly led students in the experimental group to put more effort into giving multiple attempts and making corrections during long jump practice.

Nonetheless, the results lend support to contemporary pedagogical views promoting learner-centered and technology-integrated teaching in physical education. Flipped learning strategy seems to provide the ideal combination of cognitive, active, and feedback based factors that influence motor type skill acquisition.

Conclusions

The findings of the present study show that the flipped learning strategy has a positive and effective impact on improving long jump learning performance among students of the College of Physical Education and Sport Sciences. This approach helped to increase active practice time, promote cognitive warm-up through the division of skills into phases, and gather ongoing feedback in practical sessions, which led to increased technical execution amongst students. In addition to helping a skill specify improvement by repeated patterns of action via more conventional teaching models, a flipped learning model might be the optimal manner to instrument motor skills performance when compared to traditional approaches because it has been shown that it is more learner-focused and promotes insights from digital instructional resources that reinforce high active engagement and effective conditions for motor learning.

Recommendations

Considering the study findings, it is suggested to include flipped learning strategies in athletics and physical education teaching programs for improving students' motor skill learning and practical performance. Faculty and instructors should utilize digital learning resources (e.g., instructional videos, interactive platforms) as pre-class preparation methods to help increase hands-on time in the classroom. Furthermore, as certain limitations were observed resulting from the included studies, they will be discussed in future research suggestions to evaluate the effectiveness of flipped learning for various sports skills, age categories, and educational levels, and also to assist performance development via retention of motor learning over time.

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