



THE EFFECT OF AN EDUCATIONAL PROGRAM BASED ON THE FEUERSTEIN MODEL ON LEARNING THE FOIL LUNGING SKILL IN FENCING AMONG FEMALE STUDENTS

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Abstract

This study aims to identify the impact of an educational program based on the Feuerstein model on learning the foil lunging skill in fencing among female students. The researcher hypothesized that there would be statistically significant differences between the pre-test and post-test results within the experimental group concerning skill-based variables related to fencing.

The experimental method was chosen as it suits the nature of the study. The study was conducted with female students at the College of Physical Education and Sports Sciences, University of Kirkuk, during the 2023/2024 academic year. A total of 96 students participated, divided into three classes, with Class C purposefully selected to represent the experimental group.

Conclusions:

- The educational program had a positive impact on developing the foil lunging skill in fencing among female students.
- The Feuerstein model proved effective in enhancing the lunging skill in fencing.

Recommendations:

- It is essential to change and diversify instructional methods, as they significantly enhance the learning process.
- Emphasis should be placed on using the Feuerstein model for teaching the lunging skill in fencing, while traditional methods that may diminish learning motivation should be avoided.

Keywords: Educational program, Feuerstein model, foil weapon, fencing, lunging skill

1. Study Introduction

1.1 Overview and Significance of the Study

Scientific advancements in sports have greatly improved the dynamics of various athletic activities, making them more enjoyable and engaging across different sectors. Fencing, in particular, is notable for the speed and precision required from its players. One of the most crucial movements in fencing is the thrust, a decisive action for scoring points, especially in demanding competitive scenarios that require athletes to demonstrate high levels of skill and agility.

Motor learning is significantly influenced by the effectiveness of teaching methods used to convey movement skills at an acceptable level of performance within a specific timeframe. This necessity has motivated practitioners in the field of motor learning to explore the most effective educational strategies to achieve the desired outcomes. For instance, mastering gymnastics-related skills requires students not only to understand the curriculum content but also to identify the technical phases and understand their roles during performance. This comprehension is essential for the consistent application of movement sequences.

The researcher believes that the instructional process, with its various components, forms one of the fundamental pillars of the educational process in departments and colleges of physical education and sports sciences. Its goal is to prepare future educators and athletic professionals capable of succeeding in life and



overcoming challenges. Therefore, giving careful attention to the teaching and learning process, and implementing necessary changes to achieve its goals, is of utmost importance.

The Feuerstein model is an instructional approach used by educators to connect students' prior experiences with new knowledge and to establish relationships between different subjects. This model is based on the idea that cognitive functions can be developed through structured, reflective, and intellectually stimulating challenges. It provides learners with enriched experiences that go beyond standard curricula, utilizing well-organized, purposeful, teacher-guided activities rather than random engagement. As noted by Anita (1997), this approach fosters depth of understanding and encourages reflection.

Ihsan (Ameen, 2023) highlighted the importance of implementing instructional models within a well-rounded learning environment. Such an environment should not only support cognitive and technological advancements but also actively engage learners in the learning process. By fostering collaboration, critical thinking, and creativity, educational settings can empower students to take on an active role in their own learning, thereby enhancing their overall educational experience. This approach ensures that the strategies employed are not only effective but also relevant in today's rapidly evolving technological landscape.

1.2 Study Problem:

Guiding learners through appropriate educational steps is one of the most effective ways to develop their academic abilities while also considering their physical and motor potential. A primary goal of effective learning is to prepare students to successfully tackle future challenges and overcome obstacles through practical applications. Coaches and educators commonly implement these strategies in their teaching curricula to enhance both the overall and specialized skills of learners.

Based on the researcher's experience as a former international fencer and current assistant lecturer in fencing, it has been observed that the effectiveness of instructional delivery can sometimes be limited. This situation highlights the need for instructors to be keenly aware of the conditions that facilitate optimal student learning and to understand the key elements that influence learning outcomes. Such awareness helps in selecting the most effective teaching strategies. Therefore, the researcher decided to implement the Feuerstein model in teaching female students by developing instructional units aimed at enhancing specific fencing skills.

1.3 Study Objectives

1. To create instructional units based on the Feuerstein model, specifically designed to teach the foil lunging skill in fencing.
2. To assess the impact of utilizing the Feuerstein model on the development of the foil lunging skill in fencing among female students.

1.4 Study Hypothesis

There are statistically significant differences in post-test results between the control and experimental groups in the foil lunging skill, in favor of the experimental group.

3. Study Methodology and Field Procedures

3-1 Study Methodology:

The researcher employed the quasi-experimental method due to its suitability for the nature and problem of the study.



3-2 Study Population and Sample

The study population included third-year students from the College of Physical Education and Sports Sciences at the University of Kirkuk during the academic year 2024–2025. A total of 96 male and female students were distributed across three sections. For the study sample, female students from section C were purposively selected to form the experimental group. Initially, 32 female students were chosen and divided into an experimental group and a control group, with 12 students in each group. Several students were excluded from the study, including 5 who were either injured or absent, as well as 3 who participated in the pilot study. As a result, the final study sample consisted of 24 female students.

3.3 Field Procedures:

3.3.1 Pilot Study:

A pilot study was conducted before the main experiment to evaluate the effectiveness of the foil lunging skill in fencing and the procedural steps of the model. This study took place on Tuesday, February 23, 2025, with the assistance of a support team to identify and address potential obstacles. Participants included students from the same population, though they were not part of the main sample and were selected randomly. Three students from the main study sample were excluded from the pilot study due to their involvement.

Objectives of the Pilot Study:

1. Ensure the appropriateness of the tools and devices used in the research.
2. Determine the time required for skill execution.
3. Introduce the instructor to the implementation of the instructional units.
4. Verify the compatibility of unit timing and structure with the sample.
5. Identify any challenges the instructor may encounter and minimize errors.

3.3.2 Test Used in the Study:

Test Name: Lunging Accuracy Test

Purpose of the Test:

To measure the accuracy of executing a lunge in foil fencing.

Required Tools:

- A legal foil fencing target
- An electric scoring device
- An electric foil
- A connection cable
- Two foil weapons

Performance Specifications:

The participant begins in the ready position in front of the target with all equipment connected. Foot positions are marked on the ground. Upon receiving the signal to lunge, the participant performs the movement, targeting a specific area. A total of ten attempts are allowed.

Scoring Method:

Only successful attempts are recorded—these are defined as strikes that match the designated target area and activate the electric scoring device.



Figure No. (1) shows the Lunging Accuracy Test

3.3.3 Study Tools:

The researcher created educational units for the experimental group based on the syllabus content and adhered to the steps outlined by the Feuerstein model. A sample unit was presented to subject-matter experts in learning and teaching methodologies to assess its validity and reliability. Revisions were made based on the experts' feedback until the final version was approved.

3.3.4 Pre-Test:

The researcher conducted a pre-test for the foil thrust skill on Tuesday, February 25, 2025, at 10:30 a.m. in the fencing hall at the College of Physical Education and Sports Sciences, University of Kirkuk.

3.3.5 Main Experiment:

After the researcher identified all the requirements for the main experiment and conducted a pilot experiment, which helped in organizing the work and preparing for the main study, they provided an introductory learning unit to each research group. The purpose of this unit was to equip students with prior knowledge about the skill they would be learning, as well as to achieve the objectives necessary for developing the learning situations that students would encounter while implementing the researched strategies. Based on this:

- The subject teacher implemented the learning units after the researcher provided a clear explanation of the research objectives and the functioning of each group, all under the direct supervision of the researcher.
- The main experiment commenced on Sunday, March 2, 2025, and concluded on Thursday, March 25, 2025.
- The curriculum included a total of eight learning units, delivered at the rate of two learning units per week.

The duration of the learning unit is 90 minutes, divided into the following sections:

- A. Preparatory Section (15 minutes): This includes the introduction, warm-up activities, organization of work, preparation of tools, and note-taking.
- B. Main Section (65 minutes): The core activities will take place during this time.
- C. Final Section (10 minutes): This will encompass the conclusion and wrap-up of the session.

The main section's activities were as follows:

1. Introduction: The teacher organizes the students in a square formation and explains the skill, detailing how to perform it step by step, from the preparatory section to the final part. The teacher poses questions related to the skill, encouraging students to describe it and discuss how to implement it. This approach fosters the students' creativity and helps them connect prior knowledge with new information.



As the subject teacher, it is crucial to engage the students' attention on the new topic and boost their motivation. By raising questions about the sequence of movements and their execution, the teacher can gauge the students' understanding and stimulate discussion. This interaction reveals the students' existing knowledge of the skill and provides insight into their level of comprehension, based on the questions they ask or the presentations they give.

2- Independent Work: The subject teacher divides the students into groups so they can apply the skills they observed in the first stage. The teacher encourages collaboration among the students and provides individual support as needed. They assist those who are struggling while challenging those who excel by asking thought-provoking questions that guide students toward problem-solving. This approach allows students the freedom to choose their actions and find alternative ways to achieve performance based on their level of understanding.

3- Discussion: The teacher gathers the students after the independent work phase, where he begins discussing with the students the extent of their understanding of the skill and encourages them to participate positively in the discussion.

4- Summarizing: At this stage, the lecture objectives are restated and summarized as key ideas.

5- Evaluation: The teacher tests the students on their performance of the skill they have learned according to its stages (initial, main, and final) to identify the level and extent of achievement of the educational objectives of the lesson that the student has reached in implementing the skill so that they can identify the problem, if any, in learning the skill.

3.3.6 Post-Test:

Once the implementation of the learning curriculum was complete, the researcher conducted the post-tests on Thursday, March 27, 2025. The researcher was careful to maintain similar conditions to those of the pre-tests, ensuring that the time, location, and presence of the same support team were consistent. The same procedures used for the pre-tests were followed to evaluate the students' performance.

3.3.7 Performance Evaluation:

The researcher recorded the skill under investigation by filming both the pre-tests and post-tests on videotape. This footage was then presented to a group of experts for evaluation using a form specifically designed by the researcher. The evaluations were scored on a scale of 1 to 10. Each student was allowed two attempts, and the best score from those attempts was used for analysis. The skill was assessed by four evaluators. After gathering the scores, the highest and lowest scores were removed. The sum of the remaining two scores was then averaged and divided by 2 to determine the final score out of 10.

2.4 Statistical Tools:

The researcher utilized the Statistical Package for the Social Sciences (SPSS) to analyze the data gathered during the study.

4. Presentation, analysis and discussion of results:

4.1.1 Analysis and presentation of the results from the pre- and post-tests of the lunging accuracy test for the control group:

Table 1 presents the arithmetic means, standard deviations, and t-values for the pre- and post-test results of the lunging accuracy test for the control group.

Test	Units of measurement	Pre-test		Post-test		t-value	(sig)	Statistical significance
		mean	Std.	mean	Std.			
lunging accuracy	degree	5.173	1.341	6.084	0.986	5.916	0.000	significant



Table 1 presents the results of the arithmetic means and standard deviations for the pre-test and post-test outcomes of the control group in lunging skill. The arithmetic mean for the pre-test was 5.173, with a standard deviation of 1.341. In contrast, the post-test showed an arithmetic mean of 6.084 and a standard deviation of 0.986. Comparing the arithmetic means and standard deviations from both tests indicates noticeable differences. To determine the significance of these differences, a t-test for correlated samples was conducted, yielding a calculated value of 5.916 and a significance (sig) value of 0.000, which is below the significance level of 0.05. Therefore, we can conclude that there are significant differences favoring the post-test.

4.1.2 Presentation and analysis of the results of the pre- and post-tests of the lunging accuracy test for the experimental group:

Table 2 presents the arithmetic means, standard deviations, and t-values for the pre- and post-test results of the lunging accuracy test for the experimental group.

Test	Units of measurement	Pre-test		Post-test		t-value	(sig)	Statistical significance
		mean	Std.	mean	Std.			
lunging accuracy	degree	2.15	0.639	7.873	0.837	7.483	0.000	significant

Table 2 presents the results of the arithmetic means and

standard deviations for the pre- and post-tests of the experimental group in lunging skill. In the pre-test, the arithmetic mean of the differences was 2.15, with a standard deviation of 0.639. In the post-test, the arithmetic mean increased to 7.873, while the standard deviation was 0.837. The calculated t-value was 7.483, and the significance value (sig) was 0.000, which is less than the significance level of 0.05. Therefore, we can conclude that there are significant differences favoring the post-test results.

4.1.3 Presentation and analysis of the post-test results for the experimental and control groups in the lunging accuracy test:

Table 3 provides the means, standard deviations, and t-values for the post-test results of the lunging accuracy test for both the experimental and control groups.

Test	Units of measurement	Pre-test		Post-test		t-value	(sig)	Statistical significance
		mean	Std.	mean	Std.			
lunging accuracy	degree	6.084	0.986	7.873	0.837	3.251	0.003	significant

Table 3 presents the results of the arithmetic means and

standard deviations for the lunging skill post-test results of both the control and experimental groups. The control group had an arithmetic mean of 6.084 with a standard deviation of 0.986, while the experimental group had an arithmetic mean of 7.873 with a standard deviation of 0.837. Analyzing these means and standard deviations indicates noticeable differences between the two groups. To assess these differences, a t-test for independent samples was conducted, yielding a calculated value of 3.251 and a significance (sig) value of 0.003, which is less than the significance level of 0.05. Consequently, this indicates there are significant differences in favor of the experimental group.

4.2 Discussion of the results of the differences between the pre- and post-tests:



The results from the control group, as shown in Table 1, indicate an improvement in the skill of lunging in both the pre- and post-tests. This development mirrors the progress observed in the experimental group. The researcher believes that this improvement is largely due to the application of educational units in fencing, as implemented by the subject teacher during lesson presentations. The teacher's approach and the methods used during instruction have a positive impact on students. This method is perceived as more suitable for the students, considering their physical, skill-related, and intellectual abilities. Additionally, the students' commitment to attending fencing lessons, their attentiveness to the teacher, and their eagerness to acquire knowledge about fencing skills contribute to this positive outcome.

In the experimental group, significant differences were observed between the pre-tests and post-tests regarding the foil lunging skill, as shown in Table 2. Additionally, Table 3 highlights the significant differences in the post-tests between the control and experimental groups for the foil lunging accuracy test in fencing, favoring the experimental group.

The researcher believes that the improvement seen in the experimental group can be attributed to the effectiveness of the educational units based on the Feuerstein model and the exercises employed in fencing. This model has a clear positive impact on the participants' performance. The primary aim of the Feuerstein model is to assist learners in learning and enhance their ability to adapt to their environment by transforming their cognitive landscape and equipping them with new cognitive skills. Furthermore, this model encompasses learning procedures that can be effectively utilized within the classroom, making it the most suitable model to implement. It offers the opportunity to select procedures that align with the learning units, their specific nature, the underlying concepts, learning processes, and the skills being developed.

The Feuerstein model aims to assist students in learning and enhancing their ability to adapt to their environment by reshaping their cognitive structures and equipping them with new cognitive skills (Bransford, Stein, Arbitman-Smith, & Vye, 1985, p. 133). Al-Hashemi and Al-Dulaimi argue that Feuerstein's strategy represents a significant contribution by placing the student at the center of the educational process. It focuses on higher-order thinking skills and effectively addresses the passive role that students often play in decision-making and information mastery (Al-Hashemi & Al-Dulaimi, 2008, p. 72).

The questions posed within this model clarify each component of the skills being taught, leading to increased student engagement and improved performance in cognitive tasks. Students acquire the necessary concepts and vocabulary for effective learning, and they gain an understanding of the relationships, strategies, and skills required to tackle cognitive challenges. This model fosters genuine internal motivation through a curriculum designed by the researcher, which encourages students to apply mental processes and skills in response to personal or interpersonal needs.

Moreover, the model promotes reflective thinking by allowing learners to confront both their successes and failures in completing tasks. Jawdat confirms this, stating, "The Feuerstein strategy helps the teacher assume the role of a guide and supervisor rather than a mentor, which leads to a positive impact on students' learning" (Saada, 2006, p. 78). Additionally, it cultivates authentic motivation in learners to complete tasks that bring them enjoyment, while helping them overcome any tendencies to focus on mistakes during their progress.

As students navigate initially challenging educational units, their experience, sense of responsibility, competence, and sense of control grow. The researcher also noted students' enjoyment while learning; the lesson structure evolved, resulting in more interactive participation. This teaching strategy empowers students to play a significant role in achieving learning objectives by stimulating their critical thinking and creativity and training them to solve problems they encounter. Amina asserts that the strategy "works to develop students'



tendencies and attitudes, which enhances their level of motivation and raises the level of challenge" (Hussein & Majed, 2024, p. 237).

The researcher attributes the differences and variations among students to their varying abilities to anticipate and estimate the distance, time, and lunging area required to execute the lunge movement and successfully complete the attack. Ibrahim Nabil emphasizes, "One of the most important factors for a successful attack is selecting the right timing and appropriate distance, while ensuring precision in execution" (Abdul Aziz, 1999, p. 23).

Fencing is a sport that involves a wide range of essential motor skills, which are assessed through various tests designed to evaluate players' abilities. The primary aim of these tests is to measure the different skill levels of fencers. As Alawi (1978, p. 45) notes, "The degree of mastery of motor skills related to the specific activity practiced by the individual is a crucial factor in the strategic implementation of different situations. A player's proficiency in these skills, to the extent that it approaches automation, significantly conserves cognitive resources and effort."

Therefore, it can be concluded that the reason for this is rooted in the internal processing of information related to motor performance. Often, students tend to rely heavily on external information. The researcher attributes this phenomenon to individual differences among students concerning directed reflex actions. Some students possess superior attributes, which are often the result of extensive training and their ability to endure challenges encountered during that training. For this reason, Osama Abdel Rahman states, "There is no one-size-fits-all approach to successful attacks; rather, it depends on the competitor's performance. Every attack must be aligned with the competitor's strategies, abilities, and skills" (Alawi, 2002, p. 52).

The teacher acts as a guide and mentor, providing students with the opportunity to express their opinions. This approach fosters a love for research, inquiry, and hard work among students while also stimulating their motivation and desire to learn. By analyzing the subject matter from both theoretical and practical perspectives, students can gradually reach the ultimate goal of mastering essential skills in a positive way that connects theory to practice.

Mohsen Ali emphasized that the Feuerstein strategy can create a sense of enjoyment and excitement among students, motivating them to engage more seriously in the thinking process. This engagement helps to reinforce ideas spontaneously, facilitating teaching and learning. Yazid added that this strategy also activates prior knowledge, serving as a foundation for new learning, and arouses curiosity during lessons (Attia, 2009, p. 175).

Teaching using the Feuerstein model, through educational units that incorporate demonstrations of movements, exercises, or related theoretical subjects, enhances students' observation and attention to their sensory organs. This approach facilitates rapid and sustained learning of movements, allowing students to practice and repeat these exercises during gymnastics lessons.

"Diversity and innovation in the methods used for teaching physical education are essential for creating an atmosphere of suspense, excitement, and enjoyment for learners. These approaches promote subject learning by providing appropriate opportunities, encouraging hard work, and moving away from traditional lessons that may stifle creativity" (Lazam, 2005, p. 60).

Furthermore, early success in identifying and fostering creative abilities is significant, as it lays the foundation for what students will learn later on" (Al-Zubaie et al., 2003, p. 144).

While skill acquisition primarily depends on the teaching methods and learning opportunities, it is also influenced by the quality of information, knowledge, and relevant principles provided to the learner. Additionally, the practical application of the skills being studied plays a vital role in improving skill levels



and achieving better results in post-tests. Effort, practice, and continuous repetition are essential components of the learning process, facilitated through active interaction.

Every individual possesses skills and is capable of controlling and coordinating the movements that constitute those skills. This coordination involves performing movements in the correct sequence and at the appropriate timing. Moreover, prioritizing the learner and making them the focus of the educational process is essential. This includes respecting their opinions and abilities, as well as providing kindness, acceptance, and encouragement, which are fundamental factors that facilitate learning (Hassanin and Abdel Moneim, 1997, p. 268).

The results also showed that repetition in educational units allowed learners equal opportunities to develop their technical performance capabilities, leading to increased motivation to practice their skills. The training incorporated during educational units, along with its clear application, yielded positive outcomes, as evidenced by the improvement in post-test results. This aligns with the finding that exercise or training within an educational unit has been shown to enhance skill performance, primarily depending on the type of unit and its objectives (Hussein, 2012, p. 82).

5. Conclusions and recommendations:

5.1 Conclusions:

1. The educational units utilized have a positive and effective impact on developing lunging skills in fencing.
2. The Feuerstein model has demonstrated its superiority, according to current research, among female students in the context of fencing.
3. The Feuerstein model positively influences the teaching of fundamental fencing skills.

5.2 Recommendations:

1. Utilize various educational models to enhance different fencing skills.
2. Highlight the significance of the Feuerstein model in developing fundamental fencing skills while avoiding traditional methods that may lead to boredom and a lack of motivation to learn.
3. Implement educational modules tailored for different fencing weapons and age groups.

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