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The Effect of Educational Exercises Based on the Kemp Model on Learning the Forehand and Backhand Skills in Lawn Tennis Among Students

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Abstract

The study aimed to design educational exercises based on the Kemp Model to facilitate the learning of forehand and backhand strokes in tennis among students, as well as to identify the effect of these exercises on learning the two skills. To achieve this aim, the researcher employed an experimental method using a pre- and post-test design with equivalent experimental and control groups, as it suited the research problem and objectives. The research population consisted of third-year morning students at the College of Physical Education and Sports Sciences, University of Baghdad, for the academic year 2025–2026, totaling 245 students distributed across seven sections (A, B, C, D, E, W, Y). The third-year students were selected because they study tennis within their curriculum. The sample was chosen randomly by selecting two sections to represent the experimental and control groups and then 25 students from each section were randomly selected: Section C (25 students) and Section W (25 students) making a total sample of 50 students representing 20.40% of the population. The sample was divided into two groups: an experimental group (Section C) which learned the forehand and backhand strokes using the Kemp Model and a control group (Section W) which learned using the traditional method followed by the instructor (command style) according to the prescribed physical education curriculum. Appropriate statistical treatments were applied and the results showed that educational exercises based on the Kemp Model had a positive effect on learning the forehand and backhand strokes. Furthermore these exercises provided opportunities for cooperative learning through the use of instructional aids as well as increased motivation excitement and competition among students which facilitated the

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learning process. The researcher recommends adopting the Kemp Model in teaching forehand and backhand strokes in tennis as it supports the effective implementation and achievement of educational objectives.

Keyword: Kemp Model, Forehand Strokes, Backhand Strokes.

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Introduction

In recent decades, the educational process has seen a remarkable shift toward the adoption of modern instructional design models that seek to organize the elements of the learning situation in a scientific manner, based on clear psychological, pedagogical, and cognitive principles. Education becomes a systematic process which goes beyond the traditional concept of transferring information, or demonstrating skills by identifying objectives, assessing learners' characteristics and selecting instructional activities, to establishing teaching strategies and using continuous assessment techniques from different types and methods to confirm that the required goal has been achieved (Obeid et al., 2025: Majeed et al.,2026).

The Kumb model makes it the most extensive among the existing models in instructional design as it follows a cyclical structure enabling practitioners to start from wherever they need based on how your situation looks and emphasizing integration of objectives, content activities, resources, and assessment. This model also emphasizes the analysis of characteristics and needs of learners before designing a teaching program which makes it ideal for application in physical education, where students have diverse health-related capabilities (Al-Aboudi, 2025; Hassan and Abdulkareem, 2026).

Tennis is an individual sport that requires a high degree of accuracy, neuromuscular coordination and immediate second decision-making as well as technical mastery of the basic skills. The forehand and backhand strokes are the basic elements of technical performance in tennis, being the main weapons players use to build their offense and defense as well as dictate flow of a game. Acquiring these two abilities necessitates a clear grasp of optimizing the physical elements in technical terms during the stroke (preparatory, main and follow-through), timing, balance, directional control and speed of ball (Abdulkareem et al., 2025: Hawash and Halil, 2022).

Yet the truth of teaching tennis in much of education is that it relies on timeless theories about how to teach skills, using mostly verbal methods for demonstrating correct form, but without a structured instructional design sensitive to individual differences or specific, measurable behavioral objectives. This results in high drop out, lack of proper skill mastery, an evident learning speed difference between students and decreased motivation and engagement level (Abdulhussein et al., 2026; Abbas, 2025).

The importance of this research refers to the use of contemporary teaching design models, wherein the Kumb model is designed for repetitive motor learning exercises according to scientific stages that facilitate skill acquisition and achieve a high level of performance. Accordingly, this

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study was conducted to investigate the effect of instructional exercises designed according to the Kumb model on students' learning of the forehand and backhand strokes in tennis.

Based on the researcher's experience and observations of teaching practices—as a tennis instructor herself— it became evident that most tennis instructors still rely on traditional teaching methods, which emphasize the teacher's role over that of the learner. This reduces the effectiveness of learning and weakens students' participation in building motor skills, which negatively impacts their mastery of basic skills.

There is also a clear disparity in students' performance levels for the forehand and backhand strokes, as well as a delay in mastering proper technique and the occurrence of recurring technical errors resulting from the absence of a systematic instructional plan that takes into account the skill progression and its motor components. This indicates a gap between the teaching methods used and the requirements for effective motor learning.

The Kumb model is considered one of the comprehensive models in instructional design that focuses on analyzing learner characteristics, precisely defining objectives, organizing content, and selecting appropriate activities and instructional materials, while incorporating formative assessment. However, the application of this model in physical education classes—particularly in teaching tennis skills—remains limited, which calls for an assessment of its effectiveness in improving skill acquisition.

Accordingly, the research problem is defined as answering the following question:

Do instructional drills designed according to the Kumb model have a significant impact on students' learning of the forehand and backhand strokes in tennis, compared to the traditional method?

Therefore, the objectives of this study were:

- To develop instructional drills based on the Kump model for teaching students the forehand and backhand strokes in tennis.
- To examine the impact of instructional drills based on the Kump model on students' learning of the forehand and backhand strokes in tennis.

Material and Method

The researchers employed an experimental approach, utilizing a design with two equivalent experimental and control groups and pre- and post-tests to suit the research problem and objectives. The study population was defined as third-year students in the morning program at the College of

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Physical Education and Sports Sciences, University of Baghdad, for the academic years 2025, totaling 245 students distributed across seven sections (A, B, C, D, E, F, and G). The study population was limited to third-year students because this level includes instruction in tennis. The research sample was selected by random drawing among the sections to determine the groups (experimental and control). The researcher then selected 25 students from each section by random drawing as follows:

Section C (25 students) and Section W (25 students), for a total of 50 students, representing 20.40% of the total, they were divided into two groups: a control group and an experimental group. The experimental group (Section C) learned the forehand and backhand strokes in tennis according to the Kemp method, while the control group (Section F) learned using the method taught by the teacher (the American method) and in accordance with the prescribed physical education curriculum.

Research Tools

The researchers used the following equipment and tools: 12 plastic markers of varying heights, tennis balls, 2 whistles, 5 rolls of colored tape, a 20-meter fabric measuring tape, 25 tennis rackets, and 2 “Diamond” electronic stopwatches.

The research tests consisted of:

1. Testing the accuracy of the forehand stroke in tennis from multiple zones (Karim Abdul Zahra Al-Khafaji, 2019, 116–119).
2. Accuracy of the backhand stroke in tennis from multiple zones (Karim Abdul Zahra Al-Khafaji, 2019, 116–119).

The piloting study was performed by the researchers on five students on Sunday, October 19, 2025 at 10:00 a.m. in the tennis court area of College of Physical Education and Sports Sciences building at Al-Turath University. The pilot study met its objectives goals (time taken for test completion, verification of validity of research instruments used in the pilot study and identifying any errors and challenges which arose during the course of the pilot study).

After a brief explanation of the instructions and steps required for performing and administering each test, along with all necessary requirements and materials used in the tests, the researchers executed the pre-test on Monday 20 October 2025 on the research sample. Afterward, the researchers conducted the equivalence test for the research sample, as shown in Table (1).

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Table 1. *Equivalence of the Research Groups in the Pre-Test*

Test	Experimental Group (Mean)	SD	Control Group (Mean)	SD	T-value	Sig	Significance
Forehand Stroke	3.25	1.16	3.46	1.36	0.545	0.524	Not Significant
Backhand Stroke	3.75	1.20	3.65	1.49	0.460	0.574	Not Significant

The researchers then developed a set of exercises targeting the skills under study based on the Kamb model, These exercises were administered to the experimental group on October 25, 2025, at a rate of two instructional units per week (on Saturdays and Mondays). The total number of instructional units was 16, spread over 8 weeks. The curriculum was divided into three sections:

1- Warm-up Section: 7 minutes in duration, designed to prepare the body's muscles and joints, and includes:

a- A general warm-up lasting 4 minutes.

b- A ball-specific warm-up lasting 3 minutes, tailored to the skill.

2- Main Section: 33 minutes in duration, during which body positioning for skill execution is explained, along with a set of specific exercises based on the Kemb model. It is divided into:

a- The instructional component, lasting 4 minutes, during which the correct execution of each skill is explained.

B. The practical component, lasting 29 minutes, involves applying the specific exercises according to the Kump model.

3. Concluding Section: Lasting 5 minutes, this section includes repetitions of the skill in its various parts and as a whole.

The instructor conducted the instructional sessions under the supervision of the two researchers. As for the control group, the instructor administered the exercises specific to the prescribed curriculum, allocating the same amount of time as that allotted to the experimental group. The post-test was then administered on Sunday, December 21, 2025, for both the experimental and control groups, using the same test administered in the pre-test under the same conditions and under the supervision of the researcher and the assistant team. The researchers used SPSS to obtain the research results.

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Results

Table 2. *Means, Standard Deviations, and T-Values for the Pre- and Post-Tests of the Experimental Group*

Test	Pre-Test (Mean)	SD	Post-Test (Mean)	SD	T-value	Sig	Significance
Forehand Stroke	3.25	1.16	6.15	1.93	8.277	0.000	Significant
Backhand Stroke	3.75	1.20	5.52	1.96	7.868	0.000	Significant

Table 3. *Means, Standard Deviations, and T-Values for the Pre- and Post-Tests of the Control Group*

Test	Pre-Test (Mean)	SD	Post-Test (Mean)	SD	T-value	Sig	Significance
Forehand Stroke	3.46	1.36	4.40	1.79	6.256	0.000	Significant
Backhand Stroke	3.65	1.49	4.93	1.14	5.230	0.000	Significant

Table 4. *Means, Standard Deviations, and T-Values for the Post-Tests of the Experimental and Control Groups*

Test	Experimental Group (Mean)	SD	Control Group (Mean)	SD	T-value	Sig	Significance
Forehand Stroke	6.15	1.93	4.40	1.79	7.738	0.000	Significant
Backhand Stroke	5.52	1.96	4.93	1.14	6.704	0.000	Significant

Discussion

Table 2 shows that there are statistically significant differences between the pre-test and post-test scores, with the post-test scores being higher for the experimental group in the research tests. The researcher attributes these differences to the positive impact of the instructional exercises designed according to the Kumb model, which were applied to the members of the experimental group; these exercises contributed to facilitating the learning of the forehand and backhand skills and acquiring them in an organized and integrated manner. This is attributed to the diversity and logical sequence in the presentation of the content, as well as their departure from the traditional

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routine, which created an engaging and motivating learning environment (Hassan and Abdulkareem, 2025).

Furthermore, the incorporation of progressive hands-on activities and continuous feedback within the model's steps enhanced students' understanding of the technical nuances of performance and helped correct errors as they arose, which positively impacted their mastery of both skills. This led to an increase in students' motivation to actively participate in the instructional units and perform the exercises with enthusiasm and energy, which helped achieve a noticeable improvement in their technical performance compared to the control group, as "the use of engaging exercises in training is an important factor in improving the student's technical, physical, and psychological level (Mohammed Jamil Abdul-Qadir, 1993).

Furthermore, the exercises were designed according to the Kumb model to suit the students' level, as they were designed based on scientific and pedagogical principles that take into account the nature of motor learning, by focusing on the motor aspects of the skill and the sequence of its technical stages in an organized manner, which contributed to improving students' understanding of correct performance and linking the technical stages together. This approach had a positive impact on skill performance, resulting in noticeable development and improvement in the technical aspects of the forehand and backhand strokes in tennis, as "an exercise is a motor performance defined by time and repetition; learning can only occur through it, and it leads to skill development, and all learning aims for rapid progress in both physical and mental aspects and an increase in technical motor learning" (Mahmoud Daoud Al-Rabie, 2011).

The instructional unit also provided a sufficient and appropriate amount of learning through practical exercises, as it included educational games that helped increase students' motivation to learn the skill, in addition to being enjoyable and easy to perform, which reduced fatigue, boredom, and reluctance to participate. This had a positive impact on the students' level of concentration and understanding and helped reinforce their grasp of the correct motor pathways for the skills, which ultimately led to the achievement of proper technical performance "When a skill reaches a stable stage or when the technique is difficult, the movement cannot be performed unless the player is fully aware of the skill so as to execute it correctly" (Wajih Mahjoub, 1985).

Table 4 shows that there are statistically significant differences between the post-test results of the experimental and control groups, with the experimental group performing better on the research tests. The researcher attributes this superiority among the experimental group members to the difference in the curriculum used between the two groups, as the experimental group's curriculum proved highly effective in developing students' technical performance levels through the diverse and organized exercises included within the instructional units, designed to suit the

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students' age level and their physical and mental abilities, which contributed to enhancing their capacity for comprehension and understanding and positively reflected on the improvement of technical performance in the skills under study, because "when curricula are implemented effectively, the player's overall performance improves significantly " (Mohammed Mahmoud Al-Hila, 1999, 65).

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These modules helped present the educational material in greater detail and with greater accuracy, while strengthening the connection between new information and the players' prior experiences. The teacher's role was also more effective as a facilitator, guide, and leader of the educational process, creating a positive and motivating learning environment for students. Exercises based on the Kemp model helped make learning more engaging and dynamic, and the variety and innovation of practical exercises further enhanced students' skill-based learning.

In addition, the exercises were engaging, enjoyable, and varied in terms of equipment, directions, and performance—both static and dynamic—which encouraged students to actively engage with the exercises by making repeated attempts with energy and enthusiasm. This had a positive impact on skill acquisition, as "the fundamental and essential rule in skill learning is to focus on the number of practice attempts and their variety" (Moston & Muska, 1981; Abdulghani et al., 2025).

The instructional exercises based on the Kumb model and their content an impact on the differences between the two groups, as they served as aids that facilitated the transfer of educational material to the player and provided him with direct experiences through the sensation of motor performance and a sense of skill, thereby boosting his self-confidence. This motivated him to continue performing and exert greater effort during the instructional unit, which helped accelerate the learning process, because "one of the fundamental principles that must be taken into

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account during the educational process is the availability of assistive tools and devices that accelerate learning by fostering a sense of competence and self-confidence in the development and improvement of motor and skill-based performance" (Diaa Al-Khayyat and Nofal Muhammad Al-Hayali, 2001: Jabbar et al., 2025).

Furthermore, the exercises performed by the students during the instructional units were highly beneficial, as the way they were carried out supported the players' motor, mental, and psychological development, which helped improve their motor and physical abilities. This had a more positive impact on them than on the control group, resulting in a clear effect, as "games and exercises help both genders discover their potential and develop their physical, motor, and cognitive abilities while participating in and applying these games and exercises" (Walid Ahmed Al-Masri, 1999: Star, 2019).

Conclusions

The researchers concluded that instructional exercises based on the Kumb model have a positive impact on students' learning of the forehand and backhand strokes in tennis, and that instructional exercises based on the Kumb model provided students with the opportunity for collaborative learning through the instructional methods used; furthermore, the excitement, enthusiasm, and competition among students facilitated the learning process for the forehand and backhand strokes in tennis.

Recommendations

The researchers recommend adopting the Kumb model for teaching students the forehand and backhand strokes in tennis, as this model facilitates the implementation and achievement of established instructional objectives. They also suggest conducting a study similar to the present one on other skills and activities, as well as across different age groups.

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https://jcope.uobaghdad.edu.iq

References

Abbas , A. F. . (2025). The Effect of Motor Activity Based Learning on the Acquisition of Two Tennis Groundstroke Skills. *Journal of Physical Education*, 37(4), 1145-1160. https://doi.org/10.37359/JOPE.V37(4)2025.2357

Abdulghani, L. Y., Abdulghani, M. Y., & Abdulkareem, O. W. (2025). Designing a palm pressure measurement device to improve motor coordination in freestyle swimming among female students. *Journal of Physical Education and Sport*, *25*(7), 1506-1513.

Abdulhussein, A. A., Kadhim, M. J., Abdulkareem, O. W., & Shehab, G. M. (2026). The effect of neurofeedback on free throw accuracy in female basketball players of Baghdad University. *Retos*, *75*, 496-507.

Abdulkareem, O. W., Jabbar, H. S., & Obaid, A. J. (2025). The Effect of Soft Toss Machine Training on Some Kinematic Variables and backhand accuracy of Tennis Players U16 years. *Journal of Physical Education (20736452)*, *37*(1).

Al-Aboudi , F. (2025). The effect of the progressive inquiry model on creative thinking and learning to perform the smash and court defense skills in volleyball for students. *Journal of Physical Education*, 37(2), 783-801. https://doi.org/10.37359/JOPE.V37(2)2025.2311

Hassan, M. F. A., & Abdulkareem, O. W. (2025). The Effect of Mental Training on Psychological Hardiness and Selected Personality Traits among Adolescent Male Volleyball Players. *International Journal of Exercise Science*, *18*(4), 1186.

Hassan, M. F. A., & Abdulkareem, O. W. (2026). Effects of an Integrated Balance and Muscle Tension Control Training Program on Kinematic Variables and Defensive Accuracy in Volleyball Players. *Journal of Sport Biomechanics*, *11*(4), 438-464.

Hawash, D., & Halil, M. (2022). The Effect of Using Teaching Aid on the Development of Straight Forehand and Backhand Shot Performance in Lawn Tennis. *Journal of Physical Education*, 34(3), 296-304. https://doi.org/10.37359/JOPE.V34(3)2022.1321

Jabbar. H. S., Abdulkareem O. W., Mahmod I. A., Hameed H. Y. (2025). comparative study to measure some mechanical variables between the artificial intelligence application (ON FORM) and the kinetic analysis program (KENOVEA). International Journal of Sports Science & Arts-Arabic, 81(3).

Karim Abdul Zahra Al-Khafaji (2019). The Effect of a Blended Learning Strategy Using Assistive Devices on the Development of Cognitive and Creative Motor Skills and the Acquisition of Certain Tennis Skills Among Students, Ph.D. dissertation.

Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

Mahmoud Daoud al-Rubaie (2011). Learning and Teaching in Physical and Sports Education, (Najaf al-Ashraf, Dar al-Diaa for Printing and Design).

Majeed ◌. F., Ali, Y. S. ., Abdulghani, M. Y., Ali Hassan, M. F., Abdulkareem, O. W., & Falah, A. A. . (2026). Analytical Study of Touch Areas and Preparatory Movements Leading to The Touch in Epee Fencing in The Men's Team Final at The Paris 2024 Paralympics. *Journal of Physical Education*, 38(1), 1502-1513. https://doi.org/10.37359/JOPE.V38(1)2026.2407

Mohammed Jamil Abdul Qadir (1993). Modern Physical Education, (Beirut, Dar Al-Jil Publishing).

Mohammed Mahmoud Abdel-Dayem and Mohammed Subhi Hassanein (1999). Contemporary Basketball: Scientific and Applied Foundations, 2nd ed. (Cairo, Dar al-Fikr al-Arabi for Printing and Publishing).

Mohammed Mahmoud Al-Hila (1999). Instructional Design – Theory and Practice, 1st ed. (Amman, Dar Al-Masira for Publishing, Distribution, and Printing).

Moston Muska (1981). Teaching Physical Education Carler . (E.merill, publishing company, Ohio).

Obeid, A. L. M. A., Khalifa, A. L. A. H., & Abdulkarim, A. L. O. W. (2025). Psychological hesitation and its relationship to the accuracy of serving reception skills among Baghdad University volleyball team players. *Sulaimani Journal for Humanities*, 1815-1824.

Star, H. (2019). Building Tests For Some Fundamental Skills (Forehand and backhand shots and service) In Lawn Tennis. *Journal of Physical Education*, 28(2), 1-19. https://doi.org/10.37359/JOPE.V28(2)2016.207

Wajih Mahjoub (1985). Kinesiology, (Baghdad, Bayt al-Hikma).

Walid Ahmed al-Masri (1999). An Analytical Study of the Nature of the Relationship Between Play and Its Impact on the Personality of Six-Year-Old Children, Al-Ma'alim Journal, Issue 2: (Amman, Institute of Education).