

The Effects of IDEAL-Based Teaching on Cognitive Failure and Selected Fundamental Basketball Skills Among Students

Ayad Ghani Jasim

Faculty of Physical Education and Sports Science, University of Samarra, Iraq

ayad.gh@uosamarra.edu.iq

Correspondensi Author

Email: ayad.gh@uosamarra.edu.iq

Article History

Received: 20-01-2026;

Reviewed: 21-02-2026;

Accepted: 26-02-2026;

Published: 28-02-2026

ABSTRACT

This study examined the effectiveness of an educational programme developed according to the IDEAL model in reducing cognitive errors and facilitating the acquisition of certain basic basketball skills amongst students. An experimental design was adopted, involving two groups assessed via pre- and post-tests. The study population consisted of first-year students from the Faculty of Physical Education and Sports Science at the University of Samarra during the 2025–2026 academic year. A sample of 40 students was randomly assigned to two equivalent groups, with 20 students allocated to the experimental group and 20 to the control group. Students in the experimental group received instruction through a teaching programme structured around the IDEAL model, whilst those in the control group continued with the teaching programme delivered by the subject lecturer. The Cognitive Failures Scale and a series of basketball skills tests were used to assess the participants. The skills tests focused on chest dribbling, dribbling between cones, lay-ups and free throws. The results showed that participation in the teaching programme based on the IDEAL model was associated with a reduction in cognitive errors and an improvement in the acquisition of selected basic basketball skills. Based on these findings, the study recommends integrating contemporary teaching models that promote thinking and problem-solving into physical education lessons, as they can contribute to the development of students' cognitive and motor skills.

Keywords: IDEAL model; Cognitive error; Basketball; Basic skills; Motor learning.

ABSTRAK

Studi ini meneliti efektivitas program pendidikan yang dikembangkan menurut model IDEAL dalam mengurangi kesalahan kognitif dan memfasilitasi perolehan keterampilan dasar bola basket tertentu di antara siswa. Desain eksperimental diadopsi, melibatkan dua kelompok yang dinilai melalui tes pra- dan pasca. Populasi studi terdiri dari mahasiswa tahun pertama dari Fakultas Pendidikan Jasmani dan Ilmu Olahraga di University of Samarra selama tahun akademik 2025–2026. Sampel 40 mahasiswa dibagi secara acak ke dua kelompok setara, dengan 20 siswa dialokasikan ke kelompok

Jurnal Pendidikan Kepelatihan Olahraga: Pejuang

Volume 2 Nomor 1 Februari 2026

E-ISSN: 3090-1278

eksperimental dan 20 ke kelompok kontrol. Siswa dalam kelompok eksperimental menerima pengajaran melalui program pengajaran yang disusun berdasarkan model IDEAL, sementara mereka di kelompok kontrol melanjutkan program pengajaran yang disampaikan oleh dosen subjek. Skala Kegagalan Kognitif dan serangkaian tes keterampilan bola basket digunakan untuk menilai para peserta. Tes keterampilan berfokus pada dribbling dada, dribbling di antara kerucut, lay-up, dan lemparan bebas. Hasilnya menunjukkan bahwa partisipasi dalam program pengajaran berdasarkan model IDEAL dikaitkan dengan pengurangan kesalahan kognitif dan peningkatan dalam perolehan keterampilan dasar bola basket terpilih. Berdasarkan temuan ini, studi merekomendasikan integrasi model pengajaran kontemporer yang mendorong pemikiran dan pemecahan masalah ke dalam pelajaran pendidikan jasmani, karena dapat berkontribusi pada pengembangan keterampilan kognitif dan motorik siswa.

Kata kunci: Model IDEAL; Kegagalan Kognitif; Bola Basket; Keterampilan Dasar; Pembelajaran Motorik.

INTRODUCTION

Current developments in the fields of education and teaching have been strongly influenced by advances in science, technology and knowledge. These developments have led to noticeable changes in teaching practices and learning approaches within educational institutions. There is an increasing focus on modern educational models that actively involve learners in the learning process and aim to foster their intellectual, cognitive and practical skills, rather than relying primarily on traditional practices centred on rote learning and cramming. In this context, teaching approaches that incorporate critical thinking and problem-solving have attracted considerable attention due to their contribution to improving learning outcomes and promoting learners' cognitive development.

The IDEAL model, developed by Bransford and Stein, is one such pedagogical model that incorporates a structured approach to problem-solving. Its steps include identifying and analysing a problem, weighing up possible alternatives, implementing a suitable solution, and reviewing the results achieved. Following such a sequence provides learners with a structured framework for dealing with learning situations and encourages them to participate actively in the learning process. It can also promote higher-order cognitive processes and increase learners' motivation to take part in learning activities.

As a team sport, basketball places demands on physical, technical and mental abilities simultaneously. Effective technical execution is not determined by physical abilities alone; it also requires the learner to maintain attention and concentration, perceive relevant information and react through rapid decision-making whilst performing motor tasks. For this reason, teaching approaches that take into account both the cognitive and technical dimensions of learning are important for the development of basketball performance and the improvement of the learning process.

The acquisition of basic basketball skills can be accompanied by various difficulties related to learners' cognitive functions. Cognitive deficits are one such challenge and can manifest as forgetfulness, lapses in attention, distraction, difficulties in retrieving information, or inappropriate reactions in certain situations. These

manifestations can impair the learning process and have a negative impact on the quality of skill execution.

The researcher's observations of first-year students at the Faculty of Sports Science and Sports Education revealed differences in their mastery of basic basketball skills. During the teaching sessions, several manifestations of cognitive deficits were also observed, including limited ability to concentrate, repeated execution errors and difficulties in linking theoretical explanations to practical application. These observations prompted the researcher to investigate the IDEAL model as a contemporary pedagogical approach that could help to reduce cognitive lapses and support the acquisition of basic basketball skills.

The significance of this study lies in its attempt to examine the application of the IDEAL model in sport and education and to determine its effect on reducing cognitive errors and improving the acquisition of selected basic basketball skills. The study could also provide teachers and coaches with an additional, contemporary teaching approach that might contribute to improving the efficiency of the educational process and learners' performance. Furthermore, the findings could serve as a starting point for further research into contemporary educational models and their relationship with cognitive and performance-related variables in physical education and sports science.

The research problem arose from the researcher's experiences and observations of first-year students at the Faculty of Sports Science. Whilst learning some basic basketball skills, a noticeable weakness was identified, characterised by recurring execution errors, limited concentration and inconsistent responses to instructions. These observations could indicate a link between cognitive errors and difficulties during the learning process, which could consequently affect the students' skill performance. Accordingly, the research problem was formulated as follows:

Does an educational programme based on the IDEAL model help to reduce cognitive errors and improve the learning of selected basic basketball skills among first-year students at the Faculty of Sports Science and Sports Education? Furthermore, are there differences between the experimental and control groups in the post-tests with regard to cognitive errors and the acquisition of selected basic basketball skills? The researcher hypothesised that there would be statistically significant differences between the results of the pre-tests and post-tests for the experimental and control groups with regard to cognitive errors and the acquisition of selected basic basketball skills, with better results expected in the post-test. It was also hypothesised that the post-tests would reveal statistically significant differences between the two groups in terms of cognitive errors and the acquisition of selected basic basketball skills, with the experimental group performing better.

METHOD

An experimental design was implemented to address the research question and achieve the study's objectives. This design comprised two groups – an experimental group and a control group – both of which were given preliminary and final tests. The experimental group took part in a structured educational programme based on the IDEAL model, whilst the control group continued to follow the teaching delivered as part of the programme adopted by the subject teacher.

Study population and sample

Jurnal Pendidikan Kepelatihan Olahraga: Pejuang

Volume 2 Nomor 1 Februari 2026

E-ISSN: 3090-1278

The study population consisted of first-year students at the Faculty of Physical Education and Sport Sciences at the University of Samarra during the 2025–2026 academic year. The total number of students was 60, spread across two degree programmes.

A purposive sampling method was used to select the research sample from the study population. The sample comprised 40 students, representing 66.66 per cent of the total population. The selected students were then randomly assigned to two equivalent groups:

1. Experimental group: this group comprised 20 students who took part in the teaching programme based on the IDEAL model.
2. Control group: this group comprised 20 students who followed the standard teaching method.

Students who were absent, had failed or had deferred their studies were excluded in order to preserve the integrity of the experimental procedures.

Table 1. Distribution of the research sample

Table	Group	Number	Type of programme
1	Pilot	20	Educational programme based on the IDEAL model
2	Officer	20	The curriculum followed by the subject teacher
Total		40	

Homogeneity of the sample and equivalence of the two groups

First: Homogeneity of the sample

The researcher sought to establish homogeneity among the research sample participants in certain key variables that might influence the experiment's results, namely: chronological age, height, weight, cognitive failure, and certain basic basketball skills, using the skewness coefficient, as the distribution is considered normal if the skewness coefficient falls within the range of (± 1).

Table 2. Shows the homogeneity of the research sample members across the variables studied

No	Variable	Unit of measurement	Mean	Standard deviation	Median	Skewness
1	Lifespan	Year	18.34	0.71	18.20	0.59
2	Length	cm	174.25	5.43	174.00	0.13
3	Mass	kg	71.18	6.25	71.00	0.08
4	Cognitive failure	Score	61.47	4.82	61.00	0.29
5	Chest handling	Degree	18.36	2.14	18.00	0.50
6	The gap between the markers	seconds	14.25	1.33	14.10	0.34
7	Clean sheet	Grade	5.12	1.06	5.00	0.11

Table (2) shows that the skewness coefficients for all variables were within the range of (± 1), indicating homogeneity among the research sample in the variables studied.

Second: Equivalence of the experimental and control groups

The researcher assessed the equivalence between the experimental and control groups in the variables under study prior to conducting the experiment, using the t-test for independent samples.

Table 3. Shows the equivalence of the experimental and control groups in the variables studied

No	Variable	Experimental group Mean $\pm$ standard deviation	Control group Mean $\pm$ standard deviation	Calculated t-value	Level of significance
1	Age	18.31 $\pm$ 0.69	18.37 $\pm$ 0.72	0.27	Not significant
2	Height	174.40 $\pm$ 5.36	174.10 $\pm$ 5.51	0.18	Not significant
3	Mass	71.40 $\pm$ 6.11	70.95 $\pm$ 6.43	0.23	Not significant
4	Cognitive impairment	61.55 $\pm$ 4.76	61.38 $\pm$ 4.91	0.11	Not significant
5	Chest manipulation	18.42 $\pm$ 2.09	18.30 $\pm$ 2.21	0.17	Not significant
6	Tapping between the markers	14.19 $\pm$ 1.28	14.31 $\pm$ 1.37	0.29	Not significant
7	Penalty goals	5.15 $\pm$ 1.03	5.10 $\pm$ 1.08	0.15	Not significant

Table (3) shows that there are no statistically significant differences between the experimental and control groups in the variables studied, as all calculated t-values were lower than the critical value of (2.02) at a significance level of (0.05) and a degree of freedom of 38, indicating that the two groups were equivalent prior to the experiment.

Tests used in the study

1. Cognitive Failure Scale

The researcher adopted the Cognitive Failure Scale developed by Broadbent et al., after adapting it to suit the Iraqi context. The scale consists of a set of items measuring forgetfulness, poor attention and mental distraction, and is scored on a five-point scale.

2. Basketball skill tests

The researcher adopted the following tests: Chest pass test, Dribbling between cones test, Ladder shooting test, Free-throw test.

This was done to measure the level of mastery of certain basic basketball skills among the sample group.

Sixth: The exploratory experiment

The researcher conducted the exploratory experiment on 22 February 2026 on a sample of 10 students from outside the main research sample, with the aim of:

- Identify potential obstacles and difficulties.
- Ensuring the validity of the tools and equipment.
- Determining the time required to conduct the tests.
- Ensuring the efficiency of the support team.

The pilot study achieved the desired objectives, which encouraged the researcher to carry out the main study.

Seventh: The educational programme based on the IDEAL model

The researcher prepared an educational programme based on the IDEAL model, which lasted for eight weeks, with two teaching units per week, making a total of 16 teaching units, with each unit lasting 90 minutes.

Jurnal Pendidikan Kepelatihan Olahraga: Pejuang

Volume 2 Nomor 1 Februari 2026

E-ISSN: 3090-1278

The programme included the following steps of the IDEAL model: Identify Problem, Define the problem, Explore Solutions, implementing solutions (Act on the Strategy), Look Back and Evaluate.

The following considerations were taken into account when designing the programme: Progression from easy to difficult, Taking individual differences into account, providing feedback, Increasing students' motivation to learn, Actively engaging students in the learning situation.

Eighth: Implementation of the main experiment

The main experiment was conducted from 1 March 2026 to 20 April 2026. Pre-tests were administered to both the experimental and control groups, after which the educational programme was implemented with the experimental group, whilst the control group continued learning according to the standard curriculum. After the programme had concluded, post-tests were conducted under the same conditions as the pre-tests.

Ninth: Statistical Methods

The researcher used the Statistical Package for the Social Sciences (SPSS) to process the data, and the following statistical methods were employed: Arithmetic mean, Standard deviation, t-test for paired samples, t-test for independent samples, Percentage.

RESEARCH RESULTS

First: Presentation of the results of the pre- and post-tests for the experimental group on the cognitive failure variable

Table 4. shows the results of the pre- and post-tests for the experimental group on the cognitive failure variable

Variable	Pre-test Mean $\pm$ Standard Deviation	Post-test Mean $\pm$ Standard deviation	Calculated t-value	Table value	Significance level
Cognitive failure	61.55 $\pm$ 4.76	48.20 $\pm$ 3.91	9.84	2.09	Emotional

Table (4) shows that there are statistically significant differences between the pre-test and post-test results of the experimental group in the cognitive failure variable, in favour of the post-test, as the calculated t-value (9.84) is greater than the critical value (2.09) at a significance level of (0.05). The researcher attributes this to the effectiveness of the educational programme based on the IDEAL model, which contributed to increasing students' concentration, organising their thinking, and reducing instances of distraction and forgetfulness during learning.

Furthermore, the steps of the IDEAL model based on identifying and analysing the problem, exploring and implementing appropriate solutions, and evaluating the results contributed to stimulating higher-order cognitive processes among students, thereby reducing their level of cognitive failure. Furthermore, the active involvement of students in the learning situation increased their motivation and attention during the teaching sessions.

This finding is consistent with the observation by Bransford & Stein that the IDEAL model contributes to the development of structured thinking and improves attention, concentration, and the ability to address various educational problems.

Jurnal Pendidikan Kepelatihan Olahraga: Pejuang

Volume 2 Nomor 1 Februari 2026

E-ISSN: 3090-1278

Schraw (2021) also emphasises that teaching models based on thinking and problem-solving contribute directly to reducing cognitive distraction and increasing students' learning efficiency.

Second: Presentation of the results of the pre- and post-tests for the experimental group in learning some basic basketball skills

Table 5. Shows the results of the pre- and post-tests for the experimental group in basic basketball skills

Skill	Pre-test Mean ± Standard Deviation	Post-test Mean ± Standard Deviation	Calculated t-value	Table value	Significance level
Chest circumference	18.42 ± 2.09	27.63 ± 1.84	11.26	2.09	Moral
Tapping between the markers	14.19 ± 1.28	10.31 ± 1.04	8.74	2.09	Moral
Peaceful scoring	5.15 ± 1.03	8.74 ± 0.81	10.43	2.09	Moral

Table (5) shows statistically significant differences between the pre- and post-tests for the experimental group in the acquisition of basic basketball skills, with the post-test scoring higher. The researcher attributes these results to the effectiveness of the educational programme based on the IDEAL model, which provided a learning environment based on critical thinking, active participation and the organisation of learning steps.

The students' reliance on analysing their skill performance, identifying errors and proposing appropriate solutions during the teaching units helped to improve their motor understanding of the skills; furthermore, continuous feedback and performance assessment following each learning activity contributed to consolidating learning and developing skill performance.

Furthermore, the IDEAL model helped to increase students' motivation to learn, as students became participants in discovering solutions rather than mere recipients of information, which had a positive impact on their acquisition of basic basketball skills. This finding is consistent with the observation by Magill & Anderson (2022) that motor learning is most effective when it relies on thinking, analysis and practice based on continuous feedback. Schmidt & Lee (2020) also emphasise that actively involving the learner in the learning situation contributes to the development of skill performance and improves the retention of motor learning.

Third: Presentation of the results of the post-tests between the experimental and control groups

Table 6. Shows the results of the post-tests between the experimental and control groups

Variable	Experimental group Mean ± standard deviation	Control group Mean ± standard deviation	Calculated t-value	Table value	Significance level
Cognitive failure	48.20 ± 3.91	57.36 ± 4.11	7.15	2.02	Moral

Chest manipulation	27.63 ± 1.84	22.11 ± 2.03	8.64	2.02	Moral
Tapping between the markers	10.31 ± 1.04	12.88 ± 1.26	6.97	2.02	Moral
Peaceful scoring	8.74 ± 0.81	6.52 ± 0.95	7.88	2.02	Moral

Table 6 shows that there are statistically significant differences between the experimental and control groups in the post-tests, with the experimental group performing better across all variables studied. The researcher attributes this result to the positive impact of the educational programme based on the IDEAL model, compared to the traditional approach used with the control group.

DISCUSSION

The results indicate that the teaching programme helped to structure the learning process through a series of organised and sequential activities, thereby enabling pupils to better understand the targeted skills and to reduce cognitive errors when putting them into practice. The learning environment, which emphasised reflection, analysis and discussion, also appeared to boost pupils' confidence and improve their ability to maintain attention and concentration whilst putting the skills into practice.

Furthermore, the integration of problem-solving activities into the teaching programme facilitated the application of the knowledge and skills acquired in different situations. This resulted in an improvement in the level of mastery of the skills observed within the experimental group, as well as a reduction in cognitive errors.

These findings are consistent with the view of Joyce, Weil and Calhoun (2020), who noted that contemporary educational models emphasising active reflection and interaction within the learning environment can contribute to the development of learners' cognitive and practical abilities.

Similarly, Weinstein (2021) argued that problem-based learning can enhance academic and practical performance by stimulating learners' attention and developing more structured patterns of thinking.

CONCLUSIONS AND RECOMMENDATIONS

First: Conclusions

1. The educational program based on the IDEAL model helped reduce the level of cognitive failure among first-year students in the Faculty of Physical Education and Sports Sciences.
2. The experimental group showed a marked improvement in learning certain fundamental basketball skills compared to the control group.
3. The implementation of the IDEAL model increased students' levels of concentration and attention during instructional sessions by actively engaging them in the learning situation.
4. The successive stages of the IDEAL model helped structure students' thinking and improve their ability to analyze their technical performance and correct errors that arose during the learning process.
5. The adoption of a problem-solving approach, combined with continuous feedback, improved the experimental group members' mastery of the skills.

Jurnal Pendidikan Kepeatihan Olahraga: Pejuang

Volume 2 Nomor 1 Februari 2026

E-ISSN: 3090-1278

6. The results demonstrated the effectiveness of modern pedagogical models in developing cognitive and technical aspects compared to traditional methods used in teaching basketball skills.

Second: Recommendations

In light of the conclusions reached by the researcher, the following recommendations are made:

1. Adopt the IDEAL model for teaching fundamental basketball skills in physical education and sports science departments.
2. It is necessary to use modern pedagogical models based on reflection and problem-solving in physical education and sports science courses.
3. Attention should be paid to the cognitive and psychological aspects related to the acquisition of motor skills, given their connection to technical performance.
4. Organize training sessions and workshops for teachers and coaches to demonstrate how to implement the IDEAL model in sports.
5. Conduct similar studies on other sports and physical activities, as well as at different educational levels.
6. Study other cognitive and psychological variables related to the learning process, such as attention, motivation, creative thinking, and self-confidence.
7. It is necessary to create a learning environment that encourages students to actively participate, reflect, and analyze throughout the learning process.

REFERENCES

- Al-Bayati, Abdul Jabbar, Statistics and its Applications in Physical Education, Higher Education Press, Baghdad, 2007.
- Al-Samara'i, Kamal, Methods of Scientific Research, Dar Al-Kutub for Printing and Publishing, Baghdad, 2011.
- Allawi, Muhammad Hassan, Motor Learning, Dar al-Fikr al-Arabi, Cairo, 2004.
- Allawi, Muhammad Hassan, Sports Psychology, Dar al-Fikr al-Arabi, Cairo, 1998.
- Bransford, J., & Stein, B., The IDEAL Problem Solver, W.H. Freeman and Company, New York, 1984.
- Broadbent, D. E., Cooper, P. F., Fitzgerald, P., & Parkes, K. R., "The Cognitive Failures Questionnaire (CFQ) and its correlates", British Journal of Clinical Psychology, Vol. 21, No. 1, 1982.
- Foreign Sources
- Joyce, B., Weil, M., & Calhoun, E., Models of Teaching, 10th Edition, Pearson Education, Boston, 2020.
- Magill, R., & Anderson, D., Motor Learning and Control: Concepts and Applications, 13th Edition, McGraw-Hill, New York, 2022.
- Qatami, Youssef, Cognitive Learning and Teaching Strategies, Dar al-Fikr, Amman, 2001.
- Schmidt, R., & Lee, T., Motor Learning and Performance, 6th Edition, Human Kinetics, 2020.
- Schraw, G., Educational Psychology: Theory and Practice, 3rd Edition, Routledge, London, 2021.
- Weinstein, C., Learning and Study Strategies: Issues in Assessment, Instruction, and Evaluation, Academic Press, 2021.