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The Impact of an Educational Programme Based on the IDEAL Model on Reducing Cognitive Failure and the Acquisition of Certain Basic Basketball Skills

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ABSTRACT

The aim of this study was to investigate the effect of an educational programme based on the IDEAL model on reducing cognitive failure and the acquisition of certain basic basketball skills among students. The researcher adopted an experimental approach due to its suitability for the nature of the research problem, using a two-group design with pre- and post-tests. The research population comprised first-year students at the Faculty of Physical Education and Sports Sciences, Samarra University, for the academic year (2025–2026). The research sample comprised 40 students, who were randomly divided into two equivalent groups: 20 students in the experimental group, who underwent an educational programme based on the IDEAL model, and 20 students in the control group, who followed the curriculum taught by the subject teacher. The researcher employed the Cognitive Failure Scale, as well as a number of basketball skill tests, namely: chest dribbling, dribbling between cones, lay-ups and free throws, to measure the level of mastery of basic skills among the sample participants. The researcher concluded that the educational programme based on the IDEAL model contributed positively to reducing cognitive failure and improving the learning of certain basic basketball skills and recommended the adoption of modern educational models based on thinking and problem-solving in physical education lessons, given their active role in developing students' cognitive and skill-based abilities.

Keywords: IDEAL Model; Cognitive Failure; Basketball; Basic Skills; Motor Learning.

ABSTRAK

Tujuan dari penelitian ini adalah untuk menyelidiki pengaruh program pendidikan berdasarkan model IDEAL dalam mengurangi kegagalan kognitif dan perolehan keterampilan dasar bola basket tertentu di kalangan siswa. Peneliti mengadopsi pendekatan eksperimental karena kesesuaiannya dengan sifat masalah penelitian, menggunakan desain dua kelompok dengan pre dan post-test. Populasi penelitian terdiri dari mahasiswa tahun pertama di Fakultas Pendidikan Jasmani dan Ilmu Olahraga

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Universitas Samarra, untuk tahun akademik (2025–2026). Sampel penelitian terdiri dari 40 siswa, yang secara acak dibagi menjadi dua kelompok yang setara: 20 siswa dalam kelompok eksperimen, yang menjalani program pendidikan berdasarkan model IDEAL, dan 20 siswa dalam kelompok kontrol, yang mengikuti kurikulum yang diajarkan oleh guru mata pelajaran. Peneliti menggunakan Skala Kegagalan Kognitif, serta sejumlah tes keterampilan bola basket, yaitu: dribbling dada, dribbling antar kerucut, lay-up dan lemparan bebas, untuk mengukur tingkat penguasaan keterampilan dasar di antara peserta sampel. Peneliti menyimpulkan bahwa program pendidikan berdasarkan model IDEAL berkontribusi positif untuk mengurangi kegagalan kognitif dan meningkatkan pembelajaran keterampilan dasar bola basket tertentu, dan merekomendasikan adopsi model pendidikan modern berdasarkan pemikiran dan pemecahan masalah dalam pelajaran pendidikan jasmani, mengingat peran aktif mereka dalam mengembangkan kemampuan kognitif dan berbasis keterampilan siswa.

Kata Kunci: Model IDEAL; kegagalan kognitif; Bola basket; Keterampilan Dasar; Pembelajaran Motorik.

INTRODUCTION

The world is currently witnessing rapid development in the fields of education and teaching as a result of scientific, technological and cognitive progress, which has had a direct impact on the teaching methods and learning approaches used in various educational institutions, The focus has shifted towards adopting modern educational models that place the learner at the centre of the educational process and contribute to the development of their intellectual, cognitive and practical abilities, rather than relying solely on traditional methods based on rote learning and memorisation. Learning based on thinking and problem-solving is one of the modern approaches that has proven effective in improving learning outcomes and developing students' cognitive abilities.

One such modern educational model is the IDEAL model proposed by Bransford and Stein. This model relies on structured steps for problem-solving, beginning with identifying and diagnosing the problem, followed by exploring possible solutions, implementing them, and evaluating the results. This helps learners to think systematically and engage positively with various educational situations, whilst also playing a role in developing higher-order cognitive processes and increasing motivation to learn.

Basketball is a team sport that requires a high level of physical, technical and mental ability, as good technical performance does not depend solely on the physical aspect, but is largely linked to the learner's ability to concentrate, pay attention, perceive and make quick decisions during motor performance, It has therefore become necessary to use modern teaching models that help improve the learning process and develop technical performance in a scientifically sound manner.

Furthermore, the process of learning basic basketball skills may face numerous difficulties linked to students' cognitive aspects, the most prominent of which is cognitive failure. This refers to instances of forgetfulness, poor attention, distraction, and an inability to retrieve information or execute appropriate responses in various situations, which negatively impacts the learning process and the level of skill performance.

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Through the researcher's observation of first-year students at the Faculty of Physical Education and Sports Sciences, a clear disparity was noted in the level of mastery of basic basketball skills, as well as the emergence of certain manifestations of cognitive failure during teaching sessions, such as poor concentration, repeated errors, and an inability to link theoretical instructions with practical application. This led the researcher to consider using the IDEAL model as a modern educational approach that could help reduce cognitive failure and improve the learning of basic basketball skills.

The significance of this research lies in its role as a scientific attempt to apply the IDEAL model in the fields of sport and education, and to assess its impact on reducing cognitive failure and enhancing the acquisition of certain fundamental basketball skills, as well as the potential to assist teachers and coaches in adopting modern teaching methods that contribute to enhancing the efficiency of the educational process and improving student performance. The research may also pave the way for further studies addressing modern educational models and various cognitive and skill-related variables in the field of physical education and sports science. The research problem emerged from the researcher's experience and observation of first-year students at the Faculty of Physical Education and Sports Science, He observed a clear weakness in the level of learning of some basic basketball skills, as well as repeated errors during performance and poor concentration and response to instructions. This may be linked to a high level of cognitive failure among students, which negatively affects the learning process and the level of skill performance. The research problem was defined by the following question:

Does the educational programme based on the IDEAL model affect the reduction of cognitive failure and the learning of some basic basketball skills among first-year students at the Faculty of Physical Education and Sports Sciences, and identify the differences between the experimental and control groups in the post-tests regarding cognitive failure and the learning of some basic basketball skills? The researcher hypothesised that there would be statistically significant differences between the pre- and post-test results of the experimental and control groups in reducing cognitive failure and learning certain basic basketball skills, with the post-test showing better results, and that there would be statistically significant differences between the post-tests of the two research groups regarding cognitive failure and the learning of some basic basketball skills, in favour of the experimental group.

METHOD

The researcher adopted the experimental approach as it was appropriate to the nature of the research problem and the achievement of its objectives, by designing the experimental and control groups with pre- and post-tests. The experimental group underwent the educational programme based on the IDEAL model, whilst the control group followed the curriculum used by the subject teacher.

Research Population and Sample

The study population comprised first-year students at the Faculty of Physical Education and Sports Sciences, Samarra University, for the academic year 2025-2026, totalling 60 students distributed across two academic streams.

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The research sample was selected using a purposive sampling method from the research population; the sample comprised 40 students, representing 66.66% of the original research population, and they were randomly divided into two equivalent groups:

1. The experimental group, comprising 20 students, underwent the educational programme based on the IDEAL model.
2. The control group, comprising 20 students, underwent the standard teaching method.

Absent, failed and deferred students were excluded to ensure 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.

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.

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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 ± Standard Deviation	Post-test Mean ± Standard deviation	Calculated t-value	Table value	Significance level
Cognitive failure	61.55 ± 4.76	48.20 ± 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.

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

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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

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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 educational programme contributed to organising the learning process through sequential steps that helped students better understand the skills and reduce the cognitive errors associated with performance. Furthermore, the learning environment based on thinking, analysis and discussion boosted students' self-confidence and increased their ability to pay attention and concentrate during skill performance.

Furthermore, the use of problem-solving-based educational activities helped transfer the learning effect to new situations, which was clearly reflected in the level of skill performance and reduced cognitive failure among members of the experimental group.

This finding is consistent with the observation by Joyce, Weil & Calhoun (2020) that modern educational models based on active thinking and interaction within the learning context achieve better results than traditional methods in developing students' cognitive and skill-based abilities.

Weinstein (2021) also argues that problem-based learning contributes to improving academic and skill performance by developing learners' attention and organised thinking.

CONCLUSIONS AND RECOMMENDATIONS

1. The educational programme based on the IDEAL model contributed to reducing cognitive failure among first-year students in the Faculty of Physical Education and Sports Sciences.
2. Members of the experimental group showed clear improvement in learning certain basic basketball skills compared to the control group.
3. The IDEAL model helped to increase students' concentration and attention during the teaching sessions by actively engaging them in the learning situation.
4. The steps of the IDEAL model contributed to organising thinking and improving the ability to analyse skill performance and address errors during learning.
5. The adoption of a problem-solving approach and continuous feedback led to an improvement in the skill performance of the experimental group.
6. The results demonstrated the effectiveness of modern teaching models in developing cognitive and skill-based aspects compared to traditional methods used in basketball instruction.

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

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1. The adoption of the IDEAL model in teaching basic basketball skills in physical education and sports science faculties.
2. The necessity of using modern teaching models based on thinking and problem-solving in physical education lessons.
3. Focusing on the cognitive and psychological aspects associated with the acquisition of motor skills, given their direct impact on skill performance.
4. Organising training courses and workshops for teachers and coaches on how to apply the IDEAL model in the field of sport.
5. Conducting similar research on other sports and sporting activities and for different educational stages.
6. Studying other cognitive and psychological variables linked to the learning process, such as attention, motivation, creative thinking and self-confidence.
7. The need to provide a learning environment that encourages students to participate actively and to think and analyse during the learning process.

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