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THE EFFECT OF COOPERATIVE KAGAN STRUCTURES SUPPORTED BY HYPERMEDIA ON LEARNING THE (100X4) RELAY ACTIVITY

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ABSTRACT

This research focuses on improving the learning of the technical stages of the 4×100m relay event, addressing the challenge that teaching these stages often depends on the command style, which has been shown to be ineffective in engaging students and enhancing their performance. The study aims to develop educational units using Kagan cooperative structures supported by hypermedia and evaluate their impact on learning. Using an experimental method with pre- and post-tests, the researcher compared an experimental group taught using Kagan cooperative structures and hypermedia with a control group taught using the traditional command style. The findings revealed that both groups positively impacted beginners' learning of the technical stages, but the experimental group, which used Kagan cooperative structures with hypermedia, outperformed the control group in terms of technical performance. Additionally, the use of heterogeneous grouping in the experimental group improved the performance of weaker students and motivated high- performing ones. This research highlights the effectiveness of interactive and cooperative learning strategies in improving technical performance in the 4×100m relay event.

KEYWORDS: *Cooperative learning, Kagan structures, Hypermedia.*

INTRODUCTION

Kagan structures are one of the teaching methods based on an educational program. The concept of Kagan's learning began in the 1980s, concluding that learning should be the central aspect of every lesson. Kagan structures rely on the active participation of learners in the educational process. According to Abdel-Moneim (2014), Kagan structures are among the most successful cooperative learning models due to their connection to various aspects, such as consideration of individual differences, social values, and essential skills like communication, leadership, cooperation, self-confidence, and creating an interactive classroom environment. These attributes have made the schools that implement Kagan structures the most successful globally, enabling learners to acquire diverse skills in a scientific and straightforward manner.

Track and field sports, one of the physical education curricula, consist of various events and skills. The researcher selected the (4 × 100m) relay event due to the high level of technical performance it requires. It is a dual event encompassing both individual and team components. Therefore, it is necessary to adopt instructional strategies that engage students actively in both the learning and teaching processes.[1]

As an instructor and track and field specialist, the researcher observed that many teachers still teach athletic skills, particularly the relay event, using traditional methods (command style), which involves explaining the skill, demonstrating it, and correcting common mistakes. This method does not consider individual differences among learners and fails to capture their interest or engage them actively in the learning process, leading to insufficient progress in the technical aspects of the skill. This motivated the researcher to review scientific references and conduct research on Kagan structures to investigate their potential impact on students' ability to acquire the knowledge necessary for learning the relay event.

RESEARCH PROBLEM:

Teaching the technical stages of the relay event relies on the implementation style (command style), which involves explaining the skill, presenting a model, and correcting common mistakes. This approach does not consider individual differences among learners, resulting in insufficient delivery of information about the (4 × 100m) relay event and noticeable stagnation in skill development. This limits students' ability to express their potential, abilities, and thinking.
The researcher monitored the (4 × 100m) relay event and studied its performance to understand how to enhance students' thinking toward learning its technical stages. Conducting it in an interactive learning environment has remained a persistent challenge for students. Therefore, it has become necessary for those involved in the educational process to adopt effective teaching methods that economize effort and time. The researcher chose Kagan cooperative structures as a scientific attempt to break away from traditional methods and stimulate learner motivation.

RESEARCH OBJECTIVES:

1. To develop educational units using some Kagan cooperative structures supported by hypermedia for teaching the technical stages of the (4 × 100m) relay event.
2. To identify the impact of Kagan cooperative structures supported by hypermedia on learning the technical stages of the (4 × 100m) relay event.

RESEARCH HYPOTHESES:

1. There are statistically significant differences between the pre-test and post-test results for the experimental and control groups in learning the (4 × 100m) relay event.
2. There are statistically significant differences between the post-test results of the experimental and control groups in learning the (4 × 100m) relay event.

RESEARCH FIELDS:

- **Human Field:**Students from the College of Physical Education and Sports Sciences - University of Kufa.
- **Temporal Field:**From October 21, 2023, to March 26, 2024.
- **Spatial Field:**College of Physical Education and Sports Sciences - University of Kufa.

RESEARCH METHODOLOGY AND FIELD PROCEDURES:

Research Method:

The researcher used the experimental approach, adopting an equivalent group design with pre- and post-tests, as it is the most appropriate method for solving the research problem.

Research Population and Sample:

The research population consisted of first-year female students at the College of Physical Education and Sports Sciences at the University of Kufa for the academic year 2023–2024. The total number was 40 students, distributed across two classes. After excluding students who missed tests or lessons more than once, the sample size was reduced to 34 students. The researcher randomly selected 24 students, dividing them equally into two groups (A and B)—one representing the experimental group and the other the control group. All students were of the same age group and educational level and

had no prior experience with the (4 × 100m) relay event. The average height was 160.66 cm, the average weight was 65.41 kg, and the average age was 20.58 years.

Data Collection Tools and Equipment Used:

1. Observation.
2. Personal interviews.
3. Questionnaire.
4. Tests and measurements.
5. Two Panasonic video cameras (25 fps), tripods, and 10 Princo CDs.
6. Track and field area at the College of Physical Education and Sports Sciences (outdoor field) with track markings and designated exchange zones.
7. Six relay batons, two whistles, reflective markers for key points, measuring tape, and one electronic medical scale.
8. Data recording forms.

FIELD PROCEDURES:

1. Defining Research Variables:

1-1Strategies Used:

The Kagan cooperative structures supported by hypermedia were selected as the teaching strategy for the (4 × 100m) relay event as an attempt to diversify teaching methods.[2]

1-2 Defining the Activity:

The (4 × 100m) relay event was selected based on the syllabus for track and field sports for first-year students in the College of Physical Education and Sports Sciences during the first semester.

2. Exploratory Experiments:

2-1 First Exploratory Experiment:

The first exploratory experiment was conducted on Sunday, January 20, 2024, with a sample of five students over two educational units to identify key observations and challenges related to the cooperative strategy.

The purposes of the experiment were:

1. To identify challenges in implementing the lesson, find solutions, and manage small cooperative groups during skill learning.
2. To determine the time required to perform the exercises, especially during the main part of the lesson, and ensure the instructor's understanding of the strategy used in breaking down the relay event.

2-2 Second Exploratory Experiment:

Based on the observations and guidance of experts and specialists, as well as a review of various scientific sources and references, and after conducting several meetings with experts in the field of testing, measurement, and track and field (**), the second exploratory experiment was conducted. This experiment took place on Monday, January 22, 2023, at the sports field of the College of Physical Education and Sports Sciences at the University of Kufa, with a sample of five students performing the technical stages of the (4 × 100m) relay event. The goals of this experiment were to:[3]

1. Assess the suitability of the test for the research sample, determine the time required to conduct and implement the tests, ensure the participants' understanding of the test components, and introduce the assisting team (*) to the nature of the test and their responsibilities to ensure efficiency in their tasks.
2. Confirm the performance of the three stages (preparatory, main, and final) of the relay event and verify the accuracy of the assessment forms used for the skill tests (**).
3. Ensure the correct positioning of the camera.

Table 1. Show reliability Coefficients for the Selected Tests

Tests	Reliability Coefficient	Calculated T-Value	Tabulated T-Value	Statistical Significance
Timing accuracy test for baton exchange between players	0.90	10.91	2.5	Significant
Accuracy of baton reception and delivery within the exchange zone	0.92	12.42	2.5	Significant

Note: The tabulated T-value (2.5) at the 0.05 significance level.

MAIN EXPERIMENT:

1. Pre-Tests:

Before applying the experimental approach, the researcher ensured the homogeneity and equivalence of the research sample between the two groups. It is essential to form equivalent groups concerning variables related to the research topic to ensure that any differences in the outcomes are due to the Kagan cooperative structures supported by hypermedia. After

using two introductory units to familiarize the students with the relay event, the researcher conducted a pre-test for the main sample of 12 female students on Wednesday, January 26, 2024, at the sports field of the College of Physical Education and Sports Sciences, University of Kufa. The necessary testing equipment was prepared, and the researcher used an independent sample T-test to analyze the results.

2. Educational Program and Its Implementation:

The sample was divided into two groups: an experimental group and a control group. Both groups received lessons on relay event skills from the instructor. The experimental group followed the educational program comprising eight instructional units, starting from Monday, January 28, 2024, to Wednesday, February 28, 2024, with two sessions per week. Each session lasted 90 minutes and was divided into three sections (preparatory, main, and final).

The following outlines the implementation for each group:

Experimental Group: The experimental group was taught using Kagan cooperative structures supported by hypermedia for learning the (4 × 100m) relay event. The students were divided into six small groups, each comprising four students with varying skill levels. The instructor explained the relay event sequentially, breaking it down during the initial learning stages and presenting it clearly to help the entire class understand the correct form and execution of the event.

Each student was assigned a specific part of the activity:[4]

- The first student was responsible for passing the baton to the second student.
- The second student received the baton from the first student and passed it to the third.
- The third student received the baton from the second student and passed it to the fourth.
- The fourth student received the baton from the third and ran to the finish line.

If a group encountered difficulties, they could consult the instructor for clarification. During the lessons, the instructor monitored the groups to ensure order and adherence to the tasks. Diagnostic tests were conducted at the end of each instructional unit to assess task performance. These tests served as another educational tool, providing each student with feedback on their progress and helping them identify their strengths and weaknesses.

The instructor emphasized that each student's performance contributed to the group's overall score—if individual scores were high, the group score would be high, and vice versa.

Control Group: The control group was taught using the traditional method outlined in the first-year curriculum, following the "command style" approach. This approach involved the instructor explaining and demonstrating the skill, correcting common mistakes, and not considering individual differences among students.

3. Post-Tests:

After completing the educational program, a post-test was conducted for the research sample on Monday, March 3, 2024, at 9:00 AM. The researcher ensured that the same conditions (time, place, assisting team, tools, and equipment) were maintained for both the pre-test and post-test to minimize external variables.

RESULTS AND DISCUSSIONS

- **Presentation, Analysis, and Discussion of Results:**
  - **Skill Test Results for the (4 × 100m) Relay Event:**

Table 2. Show mean, Standard Deviation, and T-Test Results for Skill Tests (Experimental and Control Groups)

Statistical Parameters (Skill Tests)	Pre-Test	Post-Test	T-Value	Statistical Significance
Timing accuracy of baton exchange	4.20 ± 0.65	7.66 ± 0.22	20.55	Significant
Accuracy of baton reception and delivery	1.37 ± 1.13	4.58 ± 0.82	9.01	Significant

Note: Tabulated T-value (2.07) at 0.05 significance level.
The table shows a significant difference between the pre-test and post-test results for both timing accuracy and baton reception/delivery accuracy in favor of the post-test.

- **Presentation of Control Group Results:**

Table 3. Show mean, Standard Deviation, and T-Test Results for Control Group

Statistical Parameters (Skill Tests)	Pre-Test	Post-Test	T-Value	Statistical Significance
Timing accuracy of baton exchange	4.08 ± 0.71	6.83 ± 0.22	18.27	Significant
Accuracy of baton reception and delivery	1.25 ± 1.22	3.41 ± 0.82	5.86	Significant

The table indicates significant differences between the pre-test and post-test results for the control group.

The results from Tables (2) and (3) show significant differences between the pre- and post-test results for both groups, favoring the post-test. The researcher attributes the improvement in the experimental group to the effectiveness of the Kagan cooperative structures supported by hypermedia, which aimed to enhance performance by following sound scientific principles in program design.

Cooperative learning increases active participation among students and reduces fatigue. It is widely agreed that students in cooperative groups benefit more when they assist each other rather than working in isolation or competition. This approach fosters teamwork and encourages collective achievement rather than individual competition.[5]

The feedback provided by the instructor and peers played a significant role in improving performance, highlighting the importance of feedback in the learning process.[6]

- **Comparison of Post-Test Results Between Experimental and Control Groups:**

Table 4. Show mean, Standard Deviation, and T-Test Results for Post-Test Comparisons

Statistical Parameters (Skill Tests)	Experimental Group	Control Group	T-Value	Statistical Significance
Timing accuracy of baton exchange	7.66 ± 0.22	6.83 ± 0.22	13.09	Significant
Accuracy of baton reception and delivery	4.58 ± 0.82	3.41 ± 0.82	4.95	Significant

The results indicate significant differences between the post-test results of the experimental and control groups in favor of the experimental group, demonstrating the effectiveness of Kagan cooperative structures.[7]

The post-test results show that the experimental group, which used Kagan cooperative structures, outperformed the control group.[8] The researcher attributes this improvement to the superiority of the Kagan strategy, which emphasizes individual responsibility within the group. Each member must complete their assigned task successfully for the entire group to achieve success, reinforcing the importance of collective effort in learning.[9]

CONCLUSIONS

1. Both the experimental group (using Kagan cooperative structures supported by hypermedia) and the control group contributed positively to beginners' learning of the technical performance of the (4 × 100m) relay event.
2. The experimental group that studied using Kagan cooperative structures supported by hypermedia outperformed the control group, which followed the command style, in terms of technical performance in the (4 × 100m) relay event.
3. The use of heterogeneous group divisions in terms of skill level helped improve the performance of lower-performing students and served as a motivator for high-performing students.
4. The use of diagnostic tests at the end of each instructional unit proved effective in teaching the essential skills of the (4 × 100m) relay event.

RECOMMENDATIONS

1. By applying "Kagan cooperative structures supported by hypermedia," it is possible to design appropriate instructional steps tailored to students' readiness and available capabilities.
2. Physical education instructors should be familiar with various teaching strategies and use the most suitable strategy for the specific educational context.
3. Further research should be conducted on different teaching strategies applied to various sports (both individual and team sports).
4. Emphasize the use of diagnostic tests between instructional units.
5. Conduct studies on instructional strategies using alternative exercise schedules, such as variable practice, etc.

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