



THE IMPACT OF INSTRUMENTAL ENRICHMENT STRATEGY ON DEVELOPING INFERENCEAL THINKING AND COGNITIVE ACHIEVEMENT FOR SOME LEARNING OUTCOMES AT TEACHING METHODS COURSE AMONG STUDENTS OF THE COLLEGE OF PHYSICAL EDUCATION AND SPORTS SCIENCES

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Abstract

This research aims to identify the effect of the instrumental enrichment strategy in developing inferential thinking and cognitive achievement of some learning outcomes of teaching methods course among students of the Faculty of Physical Education. The researchers used the experimental design for its relevance to the nature of the research. The researchers divided the participants into two equal experimental and control groups with pre and post-tests. The study recruited 50 third-year students in the College of Education and Sports Sciences at Kirkuk University for the academic year (2021-2022). After conducting homogeneity and parity tests for the two research groups, the researchers proceeded to invest the strategy of instrumental enrichment in preparing (12) teaching plans within the approved college curriculum., the statistical program (SPSS) was used to data processing. Results showed that the instrumental enrichment strategy has a significant impact on the development inferential thinking and the cognitive achievement of some principles of teaching methods among students' participants under investigation. The researchers recommended to apply the instrumental enrichment strategy in teaching the educational sport course at university level. It is also recommended to obtain various models, strategies and methods, and avoiding the focusing on one method of teaching.

Keywords: Cognitive achievement, inferential, instrumental enrichment, intelligence, strategy, teaching methods.



Introduction

The era we live in is the era of science and technology. It witnesses a tremendous expansion in the various span of life due to the tremendous progress that affects the lives of individuals in the society and they have used scientific applications in all aspects of life. Such great improvement in turn made human societies exposed to rapid changes that affected educational life systems in favor of society and advance them at the highest levels (Al-Najdi et al., 2005).

This development which distinguishes this era has extensive educational repercussions that have a clear impact on the functioning of the entire educational process. Such reflections are resulted by the modern knowledge and technologies that knocked out doors and entered quickly. Hence, to absorb and get benefit from this huge amount of knowledge, it requires preparing scientific and educational cadres that take its effective role in dimensions of development. The new view of education appeared, as it previously emphasized the external factors affecting learning such as the teacher's personality, the tone of his voice and his enthusiasm inside the class. However, now the role of the teacher has changed and becomes a facilitator to the education process, obtaining knowledge, building and treating it so that it becomes a major element of the personality's knowledge (Abu Zina, 2003).

The researchers believe that the teacher has an important role in the success or failure of the teaching method. Hence, the success of teaching relied mainly on the teacher in terms of good preparation, the ability to organize educational experiences, practical activities and direct learners during the lesson and their participation in the educational process. Moreover, the successful delivery of the scientific materials to learners needs teaching procedures or strategies that are appropriate to the students' capabilities. To sum up, investing the tremendous development and great information has become the biggest problem facing learners because of the inflated information in quantity and quality.

The instrumental enrichment strategy (henceforth IES) is teaching procedures that can be followed inside the class; it depends on the enrichment means and provides an opportunity for the teacher to choose what suits the content of the materials for teaching physical education and the nature of the concepts, skills and events it contains. IES aims to develop the ability to deal with the elements of the various thinking so that the researchers chose IES strategy. IES seeks to educates



students for understanding, is focusing on understanding and directing the focus of learners. It depends on the fact that knowledge and understanding cannot be learned by heart, but their knowledge must be built and understood from the experiences provided by the world, especially educators. Thus, the importance of this current research lies in the following:

1. Attempting to develop education and raise the level of knowledge attainment of the research sample.
2. Showing the need of the educational institutions to keep pace with scientific developments and apply modern methods and models in teaching.
3. Developing deductive thinking among students of the College of Physical Education and Sports Sciences.
4. The importance of strategy of the research in making centralizing the learner in the educational process.

Research Problem

The necessary need to think about the outcomes of education prompts us to search for renewable alternatives to teach students various sciences. Furthermore, the researchers' long experience in the field of teaching, have urged them to notice the teachers' lack of interest to apply teaching methods which centralize the learners and make them responsible for their learning and acquiring knowledge. Teaching methods are an important component of the curriculum and a reason for the suffering of the basic elements of the teaching process. Therefore, teacher is responsible for providing the appropriate educational atmosphere for the learner in a way that ensures active interaction with the elements of the educational environment in the educational situation by relying on modern techniques and methods of teaching that provoke interaction between the learner and the teacher and minimizing the domination of methods which focus on memorization and indoctrination. Learners are restricted and captivated at the time the focus should be on making the learner the focus of the educational process in order to increase the learner's achievement, increase the knowledge and develop the student's level, making them an effective element in the educational process. Therefore, there was a need to use modern methods, techniques and strategies in teaching in a way that keeps pace with developments in society. Among these strategic alternatives is the instructional enrichment with its stages that are compatible with the vocabulary



of teaching methods and which focus on building the student's ideas, performance and activity. Thus, this strategy may raise and develop the level of learning; the research problem was crystallized to answer the following question:

What is the effect of the IES on developing inferential thinking and cognitive achievement among students of the College of Physical Education and Sports Sciences at the University of Kirkuk?

Research Objective

The research aims to identify the effect of IES on developing inferential thinking and cognitive achievement of some principles of teaching methods among students of the Faculty of Physical Education and Sports Sciences at Kirkuk University.

Research Hypotheses

The researchers hypothesized that:

1. There are statistically significant differences between the students' scores in the pre and post-tests of the experimental group and the control group in the inferential thinking of the students of the College of Physical Education and Sports Sciences at the University of Kirkuk.
2. There are statistically significant differences between the students' scores in the post-test of the experimental group and the control group in inferential thinking and cognitive achievement of teaching among students of the College of Physical Education and Sports Sciences at Kirkuk University.

Instrumental Enrichment Strategy

It is to provide students with diverse and in-depth experiences in topics or activities that exceed what is given in the regular school curriculum. These experiences include complementary curricula that enrich their outcomes in an organized, purposeful and planned manner with the guidance and supervision of teachers, and not in a random manner (Choice, 1997).

Cognitive Achievement

Academic achievement, in its modern sense, is the acquisition of scientific knowledge and the correct methods through which study skills can be accessed in



a scientific and organized manner. It is focused on two fundamental aspects on learning outcomes, i.e., knowledge and skills (Al-Jameel, 2000). Academic achievement is one of the motivations to the mental activity that students will do. It shows a clear impact on the academic excellence that a student obtains (Al-Shammari, 2011).

Methods

Research Design

The researchers used the appropriate experimental design for the nature of the research, and the partial test design was chosen and is called the design of random groups with pre and post-tests (Van Dalen, 1977). The study was performed on Third year students at University of Kirkuk at the College of Physical Education and Sports Sciences. It continued from 16/11/2021 to 17/1/2022.

Research Sample

The research community is one of the third academic year students at the Faculty of Education and Sports Sciences at the University of Kirkuk for the academic year (2021-2022). They are totally amounted 140 students distributed among three divisions. The division (C) was chosen randomly to be the experimental group and the Division (A) to be the control group as for the research sample, it was made up of (50) students, with (25) students for each group, after the exclusion of female students, students who failed or postponed and students whose absences were repeated and who did not attend the acquisition of knowledge achievement from the research community.

Homogeneity of the Two Research Groups

Controlling of the experimental design variables is one of the most important procedures in experimental research because it achieves an internal validity of the experimental design. It also makes the design free from the side effects of the internal variables and thus the researcher can invade the change in the variables to the impact of the independent variable and not to the impact of other variables. So, the researchers resorted to verify the homogeneity of the two research groups through the following variables:



Table 1. Homogeneity of the two research

Variables and measurement unit	Experimental group		Control group		The calculate d T value	Sig.	Effect
	Mean	Std	Mean	Std			
1. Age is calculated by months.	251.840	3.387	251.360	3.534	0.490	0.626	No significant
2. Academic achievement, the subject of teaching methods for the last year (the secondary school stage).	67.960	6.585	70.320	5.735	1.351	0.183	No significant
3. Intelligence testing degrees	47.160	4.497	46.680	4.643	0.371	0.712	No significant
4. Test of inferential thinking	17.360	4.480	20.920	3.684	3.069	0.104	No significant

Significant if the value (Sig. > 0.05).

Table 1 indicates that the value of the significant was greater than 0.05. It shows that the two groups are equivalent in the mentioned variables.

Instruments

Inferential Thinking Test

The researchers used a test of inferential thinking, which was modified to suit it on the Iraqi environment (Abdullah, 2015). The adapted test was presented to a group of arbitrators with experience and specialization to ensure the extent of its suitability and suitability in a way that is consistent with the goal of the research. This test consists of 30 Multiple choice item which measures the student's ability in inferential thinking. The measure items are belonged to topics which revolve around general issues and are answered by placing a circle around one of the three alternatives, so his Maximum degree is 30 and the minimum is zero.

Achievement Test

The researcher used the achievement test prepared by (Al-Qarni, 2017) and was applied to students of the College of Physical Education and Sports Science at Tikrit University (see Appendix 6). It is commensurate with the current research objectives, where it is involved in educational content as well as the study stage, and after Consulting experts, as in the Appendix (3), the researcher adopted the achievement test, which consists of (9) nine questions, including options and



phrases, correct or wrong and determining the correct answer and the total degree of the test 100.

Research Procedures

The exploratory experience strategy is the instrumental enrichment

The researcher conducted the exploratory experience of the strategy on a sample of 15 students in the research community. They were not the sample on Tuesday (11/16/2019), and its aim was:

1. Ensuring that the teacher can implement the proposed teaching and strategy plans.
- 1-Identifying the challenges that appeared during the implementation.
- 2-Ensuring of the validity of the teaching plans for implementation.
- 3-Giving future research clear ideas of the followed procedures.

Pre- Tests

The researchers conducted pre-tests of inferential thinking on the two research groups and on 11/21/2021.

Main Experience

After the researchers completed implementing the experiment's procedures to ensure the homogeneity of the two groups, preparing plans and determining the variables used in the research represented (testing inferential and the cognitive achievement test). The course professor began applying the experiment to students of the two research groups on Tuesday (Nov. 23, 2021). He taught two sessions weekly for the two groups of research, and the experiment lasted for six weeks, and ended on Monday, Jan.13, 2022, with the implementation of 12 study units. The course-professor taught the two research groups according to the teaching plans, which were prepared based on the strategy of the instrumental enrichment in teaching students the experimental group. He also applied the traditional method in teaching the control group students, and according to the curriculum prepared by the college on the experimental group. The strategy includes several steps:



Introduction

The course professor presents the goals of the tasks that students practiced inside the lesson, then determines the problems that they will solve and the subject of the lesson revolves around. The teacher ensures that the students understand the terms, concepts and instructions for the lesson.

Independent Work: The student performs the independent work, where each student solves the exercises for the lesson in his activity brochure. The professor must provide individual assistance to each of them and provide them with the keys to solving the exercises and encourage them to make the utmost effort and continue their success successfully and transmit in them self-confidence and prevent any kind of frustration while solving the exercises.

Discussion: the professor discusses the solutions that students have reached. They also try to apply the concepts associated with the lesson in new situations, after they finish the independent work, provided that each student takes his/her time to amend one's answer and reach the correct solution and encourage her/him to participate positively in the discussion.

Summary: The professor summarizes the lesson, by displaying his/her main goals and ideas.

Evaluation determines the extent of the strategy contribution to improving the educational level of students and raising their academic and scientific level. That happened by gauging the extent to which the educational goals of the lesson are achieved, and although these previous steps are fixed in each of the intermediate enrichment lessons. Therefore, the instructor must be flexible when preparing and implementing the lesson. The professor may deviate from these steps, according to the needs of students and the circumstances surrounding them in the classroom.



Post-Tests

Post-tests were administrated on Jan 17, 2020 for the two research groups on the inferential thinking and achievement tests on the same spatial and timing conditions.

Results

The researchers used the SPSS to analyze the gathering data. To prove or refute the first research hypothesis, which states the existing of statistically significant differences between the experimental and control group students' scores in the pre and post tests on the inferential thinking at College of Physical Education and Sports Sciences at the University of Kirkuk. The researchers compared between the mean scores of the control and experimental group for the inferential thinking in the pre and post-tests.

Table 2. The two research groups result in the pre and posttests on inferential thinking

Variables	Pre-test		Post-test		T value	Sig	Significant
	Mean	Std	Mean	Std			
Experimental group	17.360	4.480	24.190	2.544	2.351	0.00	Significant
Control group	20.920	3.684	23.420	2.984	3.471	0.00	Significant

Table 2 indicates that the mean scores of the experimental group students in inferential thinking in the pretest test amounted to ($M=17.360$), and a standard deviation ($Std=4.480$). In the post-test, the students' mean scores reached ($M=24.190$) and the standard deviation ($Std=2.544$) with the value of significant ($Sig.= 0.00$). Moreover, the students of the controlled group scored in the pretest, a mean score of ($M=20,920$) and the standard deviation ($Std=3.684$). As for the post-test, the mean score reached ($M=23.420$), the standard deviation ($Std=2.984$) and the probability value of significant, ($Sig.= 0.00$). This shows that the morality of the differences in favor of the post-test in both groups, the effectiveness of the strategy and the method used in developing inferential thinking.

For verifying the second hypothesis, which is the existence of statistically significant differences between students' mean scores in the dimension of the experimental group and the group control group in inferential thinking and cognitive achievement teaching among students of the College of Physical



Education and Sports Sciences at the University of Kirkuk. Moreover, the researchers compared the students' scores of the experimental group and the set of control in the post -test of inferential thinking and cognitive achievement as shown in Table 3.

Table 3. Statistical transactions of the post-test of the experimental and controlled by the inferential thinking and cognitive achievement

Variables	Experimental group		Control group		T value	Sig	Significant
	Mean	Std	Mean	Std			
Inferential thinking	24.190	2.544	23.420	2.984	2.351	0.00	Significant
Cognitive achimenes	74.58	1.691	62.25	1.285	3.471	0.00	Significant

Table 3 shows that the mean of the scores of the experimental group students in inferential thinking in the post test reached ($M=24.190$), and standard deviation ($Std=2.544$). On the other hand, the control group scored in inferential thinking reached mean score ($M=23.420$) and standard deviation ($Std=2.984$). Furthermore, the post-test scores of two groups in the cognitive achievement test were also compared. The control group achieved the mean score ($M=62.25$), with the standard deviation ($Std=1.285$), with the probability Sig. value (0.00) in both variables. Such value indicates the significant differences in favor of the larger mean scores, i.e., the experimental group students who were studied according to the instrumental enrichment strategy. It therefore, indicates its superiority in developing students' inferential thinking and cognitive achievement.

Discussion

Results indicated the superiority of the students of the experimental group who studied the course of teaching physical education according to the strategy of instrumental enrichment in the development of inferential thinking and cognitive achievement over the students of the control group who studied same course of according to the usual conventional method and the teacher's style of teaching. The researchers attribute these results to:

- Teaching according to the IES for physical education teaching course has an impact on raising the level of academic achievement for students of the third level of the Faculty of Physical Education by comparing the results of the post test of the experimental group and the post test of the control group.



- The IES helped to generate new ideas and concepts related to the main topic under study; it works to enhance thinking and link previous ideas with new ideas.
- Teaching according to the IES transferred the role of the teacher from being a prompter to the mentor and provided the students with the opportunity to discuss, express their opinions and feel confident.
- The various activities pertained in the IES helped the students to raise the level of their knowledge.
- The IES provided opportunities for students to learn according to their own potential.
- The IES originally depends on mastery of learning as an essential aspect of the strategy; this may have an impact in achieving such mastery.
- The students' love for thinking and its various steps and the effect of the IES helped increase their motivation to learn which helped in their superiority in the post-test.
- The IES in its broad sense led students to use all their mental abilities and capabilities through dialogue and discussion. This in turn led to the use of many other thinking skills such as inferential reasoning.

The result of the current study, which showed a statistically significant difference in the achievement variable in favor of the experimental group. It is in line with the results of the study (Al-Bahnasawy, 1999) and (Al-Banna, 2000). They reported that learning with this IES is a meaningful learning. They indicated that following the IES led to the storage of information in the memory in a correct manner that could be retrieved easily and quickly when needed. Furthermore, the results of this study are also confirmed with the results of (Azab & Abdelkader, 2004) and (Al-Masoudi et al., 2018).

Conclusions

1. The IES has an impact on developing inferential thinking and cognitive achievement among third-year students in the College of Physical Education and Sports Science in some elements of physical education teaching course. It compared the scores of the experimental group that studied according to the model and the control group that studied according to the usual method.



2. The effectiveness of the IEA in making the student the focus of the educational process, and this is what modern methods of teaching seek to achieve.
3. Teaching with the IES encouraged interaction between the learner and the teacher, expressing opinions, presenting different and new ideas and constructive ideas, linking previous ideas with new ideas, and freedom of discussion.

Recommendations

1. Adopting the IEA in teaching the course physical education at the university level.
2. -Preparing a training or counseling program for teachers on how to use the IES to develop the teaching methods and strategies used.
3. Emphasizing the use of strategies that encourage the role of the learner in the educational process and involving them in such learning environment.
4. Diversifying in the use of modern models, strategies, and teaching methods and not focusing on one strategy or method of teaching.

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