The Effects of the Course of Intelligence Games Towards Students' Attıtudes

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Abstract— **Various games and activities of students can be used as an effective tool in the development of mental capacities, skills and intelligence games. Intelligence games are games that have all kinds of problems, including real problems. So it is a good tool to teach problem solving. The course of intelligence games will enable students to develop capacity for problem perception and assessment, to create different perspectives, to be able to make quick and correct decisions when they encounter problems, to develop a problem-solving and problem-solving habit, and to use reasoning and logic effectively. Therefore, it is appropriate to use a stepwise teaching approach to teaching mental games. In the middle school the course of intelligence games teaching program, learning areas are divided into 6 categories according to game categories: Reason Execution and Transaction Games, Verbal Games, Geometric - Mechanics Games, Strategy Games, Memory Games and Intelligence Questions [1]. The purpose of this research is to examine the effects of the course of intelligence games on the mathematics attitudes of Grade 5 students. Research was conducted in the 5th Grade of a private school in Antalya province. The experimental part of the research is comprised of the effects of the course of intelligence on students' mathematics attitudes. This part of the research is conducted by the pretest-post-test control group design. Of two equal classes, one group is randomly assigned to be the experimental group and the other the control group; pre-test and post-test measurements were carried out in both groups. Experimental design with control group was used in the research. Mathematics attitude scale was used as pre-test and post-test in the research. In the analysis of the data, t test was used to compare the pretest and posttest scores. Between the pretest and the posttest, the lectures in the experimental group were carried out during the education period, including 2 hours per week. The lessons are supported each week by different activities of mental games. In the control group, teaching was done according to the current curriculum. To determine whether there is a meaningful difference between pre-test and post-test scores of experiment and control groups, analyzes were tried to determine the effect of mental games on math attitude. According to the results of the analysis, it was found that the students in the experimental and control groups had a significant difference between their pre-test scores and post-test scores within the mathematics attitude scale.**

Index Terms— **Attitudes, intelligence, intelligence games, course of mathematics, mathematics education.**

I. INTRODUCTION

Being able to produce original and different solutions, to see more than one answer of a problem and to be able to produce alternative answers is the basis of the present day for the individual to generate surplus value for his own life as well as the society. It is known that the mind, logic, cognitive capacity and reasoning that enable us to think differently and produce different solutions are qualities that can be improved throughout human life.

However, this development is relatively easy and faster at early ages. Intelligence is the ability to acquire and apply knowledge and skills. In other words the ability to grasp the relationship between abstract or concrete objects using concepts and perceptions, abstract thinking, reasoning, and the ability to use these mental processes for a purpose is called intelligence. According to Einstein, the true indicator of intelligence is not knowledge, but imagination.

A stepwise teaching approach is based on the understanding that pre-learning levels of learners, learning styles, intelligence dimension and thinking systems may be different. The stepwise teaching approach is designed to make students learn from simple to complex, difficult to easier, abstract to concrete, unknown to know, presenting learning opportunities that show progress and relationships. Intelligence games are based on the course and its activities problem solving. Students will be able to solve problems not only in numbers and shapes but also in real life materials and relate them to real world problems.

II. PURPOSE

This study examines the effects of the course of intelligence games on 5th grade students' attitudes in the 2016-2017 academic years.

III. METHOD

The research group of this study is comprised of 46 fifth grade students, studying in Antalya, Muratpaşa, as of 2016-2017 academic years. The experimental part of the research is comprised of the effects of the course of intelligence games on students' attitudes. This part of the research is conducted by the pre-test and post-test control group design. Of two equal classes, one group is randomly assigned to be the experimental group (n=15), and the other the control group (n=20); before conducting the research, to ensure the equivalence between the experiment and control groups, maths attitudes test were identified.

In order to identify students' attitude level towards mathematics, a Likert-type scale on the subject was used [3].

The "Mathematics Attitude Scale (MAS)" developed by Baykul [4] was selected to be used in this research. The scale is comprised of 30 articles. In the tool, the responders were given a five-grade scale. The scale explained by a single factor has 15 positive (1, 2, 5, 6, 10, 11, 12, 16, 17, 18, 23, 25, 26, 27) and 15 negative (3, 4, 7, 8, 9, 13, 14, 15, 19, 20, 21, 22, 24, 28, 29, 30) factors. The factor analysis on the factor structure of the scale indicates that the variance explained by a single factor is 56%. The alpha internal consistency coefficient of the scores obtained by the scale was found to be 0.96. The highest possible score to be obtained in the scale was 150, while the lowest score was 50. A high score to be obtained in the scale indicates a student's positive attitude towards mathematics [5].

Before the experiment process, the Mathematics Attitude Scale (MAS) was applied both to the experiment and the control groups. In addition to the current mathematics program, the experiment group took two hours of intelligence games course in a week. In the control group, the lessons were processed according to just the current mathematics program.
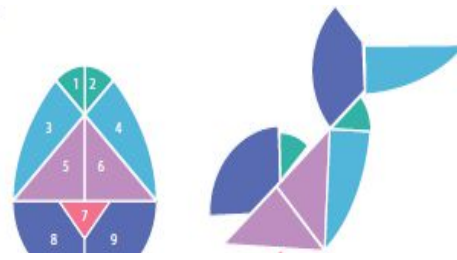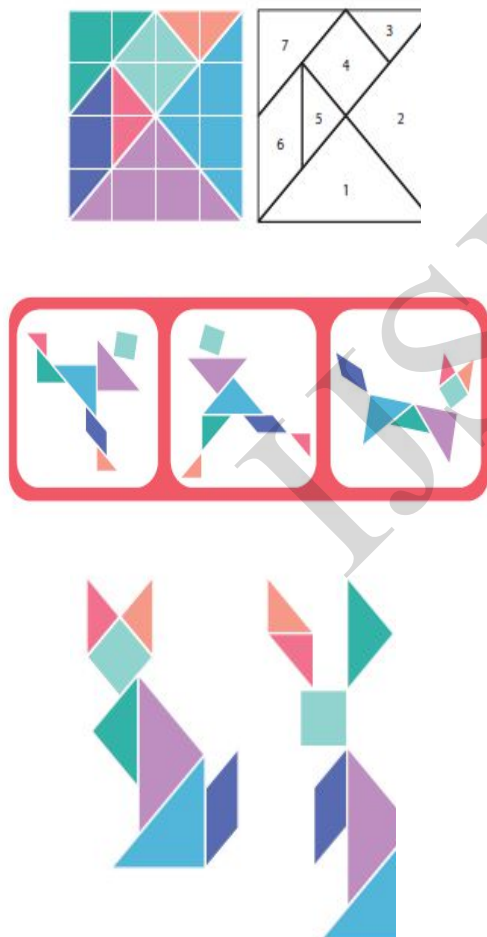

Fig. 1: Example of Tangram Activity [2]

Fig. 2: Example of Sudoku activity [2]

Fig. 3: Example of square operation activity [2]

Fig. 4: Example of Kakuro [2]

After the experiment process in the experiment and control groups, the MAS was applied as post-tests. Data were analysed through unrelated samples t-test to define whether the students' pre-test and post-test scores for the Mathematics Attitude Test indicate a significant difference per groups. Related sample t-test was applied to define whether there was a significant difference between the pre-test and post-test scores of the experiment and control groups within themselves. The normality hypothesis has been tested and found to have been provided before analyzing data. A significance level of 0.05 was considered in interpreting for all results [6].

IV. FINDINGS

Analyzes were made to determine whether there was a significant difference between the pre-test and post-test scores of the experimental and control groups and to determine the effects of the course of intelligence on the mathematics attitude of the students. In order to define whether the students' pre-test and post-test scores for the Mathematics Attitude Scale indicate a significant difference per groups, the data was analysed through unrelated samples t-test. The finding of the analysis was given in Table I and Table II.

Table I: The comparison of Pre-Test Attitude Scores between the Experiment and Control Groups

Group	N	X	S	sd	T	p
Experiment	15	3.25	0.25	33	-1,716	0.096
Control	20	3.11	0.24			

As a result of the conducted t-test, since the significance value of the pre-test attitude scores is higher than 0.05 (p=0.096 >0.05), there has been no significant difference between the attitude scores of the groups.

Table II: The comparison of the Post-Test Attitude Scores between the Experiment and Control Groups

Group	N	X	S	sd	t	p
Experiment	15	3.43	0.34	33	-2,578	0.015
Control	20	3.17	0.24			

As a result of the conducted t-test, since the significance value of the post-test attitude scores is lower than 0.05 (p=0.015 < 0.05), there has been a significant difference between the attitude scores of the two groups.

In order to define whether there was a significant difference between the pre-test and post-test scores of the experiment and control groups within themselves, a related samples t-test was applied. The results of the analysis were given in Table III and Table IV.

Table III: The Comparison of the Pre-Test and Post-Test Attitude Scores in the Experiment Group

Group	N	X	S	sd	T	p
Test (pre)	15	3.25	0.25	14	1,45	0.168
Test (post)	15	3.43	0.35			

As a result of the conducted t-test, since the significance value of the pre-test and post-test attitude scores is higher than 0.05 (p=0.168 > 0.05), there has been no significant difference between the group's average attitude scores.

Table IV: The Comparison of the Pre-Test and Post-Test Attitude Scores in the Control Group

Group	N	X	S	sd	T	p
Test (pre)	20	3.11	0.24	19	0.90	0.377
Test (post)	20	3.17	0.25			

As a result of the conducted t-test, since the significance value of the pre-test and post-test attitude scores in the control group is higher than 0.05 (p=0.377 > 0.05), there has not been a significant difference between the group's average attitude scores.

Considering the findings presented in Table III and Table IV, the significance level between the pre-test and post-test means of the experiment group, to which intelligence games course was given, is similar that of the control group.

V. RESULTS

When the analysis results were evaluated, a significant difference was observed on post-test between experimental group and control group. Significant differences were found in the mathematics attitudes of the students who took the course of intelligence games compared to the students who did not take this course. According to the results taken from the research findings, it has been detected that taking the course of intelligence is more effective on student attitude towards mathematics, compared to not taking this course. In order to measure the effectiveness of taking the course of intelligence on students' attitude towards mathematics, pre-tests and post-tests were applied to the experiment and control groups. The post-tests of two equivalent groups display no significant difference. The relationship between the pre-test and post-test results of each group within itself was examined, it was detected that there were no significant differences on experimental and control groups.

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