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THE EFFECT OF GEMS PROGRAM ON THE BASIC SCIENCE PROCESS SKILLS AND ATTITUDES OF 6TH GRADE STUDENTS IN THE FORCE AND MOTION UNIT

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ABSTRACT:
THE AIM OF THIS STUDY IS TO INVESTIGATE THE EFFECT OF GEMS GREAT EXPLORATION IN MATH AND SCIENCE (GEMS) SCIENCE AND MATHEMATICS PROGRAM ON STUDENTS' BASIC SCIENCE PROCESS SKILLS AND ATTITUDES IN THE 6TH GRADE ELEMENTARY SCHOOL "FORCE AND MOTION" UNIT THE EFFECTS OF THE PROGRAM AND TO GET THEIR OPINIONS. THE SAMPLE OF THE STUDY WAS A GROUP CONSISTING OF 80 6TH GRADE MIDDLE SCHOOL STUDENTS, ONE EXPERIMENTAL (N = 40) AND ONE CONTROL (N = 40) GROUP. IN ORDER TO DETERMINE THE LEVELS OF STUDENTS' BASIC SCIENCE PROCESS SKILLS AND ATTITUDES, BASIC SCIENCE PROCESS SKILLS SCALE FOR "FORCE AND MOTION" (BSPST) SCIENCE COURSE ATTITUDE SCALE (SCAS) WERE APPLIED TO BOTH GROUPS AS A PRE AND POST-TEST. WHEN THE BSPST POST-TEST SCORES OF THE EXPERIMENTAL AND CONTROL GROUP STUDENTS WERE COMPARED ACCORDING TO THE RESULTS OBTAINED FROM THE DATA COLLECTION TOOLS, IT WAS CLEAR THAT THE BASIC SCIENCE PROCESS SKILLS LEVELS OF THE EXPERIMENTAL GROUP STUDENTS IMPROVED MORE. ACCORDING TO SCAS RESULTS; WHEN THE POST- TEST ATTITUDE SCORES OF THE EXPERIMENTAL AND CONTROL GROUPS WERE EXAMINED AFTER THE APPLICATION, THE ATTITUDES OF THE EXPERIMENTAL GROUP STUDENTS TOWARDS THE ACTIVITIES DONE IN THE SCIENCE COURSE WERE MORE POSITIVE IN THE 1-MONTH PERIOD FROM THE PRE-TEST TO THE LAST TEST THANKS TO THE GEMS ACTIVITIES.,

KEY WORDS: GEMS, SCIENCE EDUCATION, BASIC SCIENCE PROCESS SKILLS

INTRODUCTION

The rapid developments in our age have led to the increase of scientific knowledge exponentially, and upon this, the difficulties in accessing scientific information, explaining,

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and using it in daily life have come to the fore more. In some cases, traditional training methods are not sufficient to overcome these difficulties. In line with this need, innovative teaching approaches have emerged[4]. In recent years, a lot of research has been made to increase the content and efficiency of educational programs. In particular, studies on combining science and mathematics have accepted basic science processes as a common point and many projects have been developed in this direction. One of the important examples of these projects is Great Exploration in Math and Science (GEMS) Science and Mathematics Program[5].

The GEMS combines science and mathematics to provide students with an interest in science and mathematics with fun activities, enabling students to gain all processes of science through effective learning and critical thinking, independent learning, they learned to draw conclusions, analysis and synthesis, developing skills such as questioning innovative activity, is a program[6]. The GEMS Program, which is implemented in many countries of the world, offers a wide spectrum from preschool to high school with its applications including contemporary learning approaches. As a starting point, the child should be encouraged to explore and understand the world as a scientist from birth and to apply learning methods by the principle of life long learning; it is a constantly evolving program with an international network of guidance books, seminars, and courses for educators and families [7].GEMS was first created in 1984 by the LHS Law of Hall of Science (LHS) science center at the University of California [8] . It is used as a highly flexible enrichment program to deepen the learning of children and to support the use of children's learning. The number of qualifications included in the GEMS program can be processed in a long time and at different grade levels as the content increases. Nationwide's tested in thousands of class GEMS programs, teachers more guides and manuals also developed 70 for, students offer learning experience and a wide range of learning benefits until high school seniors from pre-school [9].In addition to this, training courses, trainers, and seminars including educators and families are being revised continuously by an international communication network [10].

The activities in the guidelines are flexible enough to address multiple grade levels according to the curriculum of the country or region that will use it. The guides provide teachers with detailed information on how to proceed, the materials, and methods to use. It also contributes to teachers by offering practical ways in classroom practices, suggestions for

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[4] Tekbıyık, A.. *Science Teachers' Expectations from Parents: To What Degree Do Parents Think They Satisfy Such Expectations?* Stanisław Juszczyk: 2013,202.

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material supply, and different perspectives. Teachers can use the ready-made GEMS units to adapt them to the students and develop their own GEMS designs [11]

GEMS is an approach that encourages students to work together and provide environments for finding solutions to mysterious activities [12].Therefore, it has traces of multiple intelligences theory in terms of adopting both constructivist theory and interdisciplinary transitions [13]. Also, activities in this approach; it has the flexibility to be tailored for students with different intelligence, abilities, knowledge levels, or learning styles. In the program, a process-based assessment is conducted and the products and scientific skills of children are evaluated throughout the process [14,15]. In the GEMS program, students evaluate the permanence of the information they have learned, where the assessment is not bound to a certain standard. The most important element here is that evaluation is a process evaluation and alternative measurement and evaluation tools are used [16]. The most obvious feature of GEMS activities is that it incorporates guided discovery based on scientific inquiry. In the guided exploration approach, the active participation of students for effective learning is emphasized, where the aim is to make the students feel the basic science process skills directly [17]

GEMS activities prepared in line with the constructivist approach are integrated into the National Education Program and the objective of the program is to transfer the basic skills in the courses such as basic science process skills, meta-cognitive skills, and mathematics and science to students through GEMS activities. Basic Science process skills that are effective in developing students' high-level skills are directly related to GEMS activities [18]

"Basic skills that facilitate learning in Science, gain research paths and methods, enable students to be active, improve the sense of responsibility on their own learning and increase the permanence of learning are called science process skills" [19]. According to the American Association of Advancing Science (A.A.A.S.), the basic science process skills are classification, measuring, making observations, using numbers, saving data, making

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predictions, and using space/time relationships[20,21] When students begin to like mathematics and science they lay the first foundations of scientific thought through the fun activities of the GEMS Programme. While Science and nature studies in the GEMS Programme provide students facility of hands-on, observing, and exploring learning it also leads to gain basic science process skills. Students learn to research and observe themselves and discover knowledge through their own experience. GEMS subjects are prepared according to the usage of the basic science process skills of students [22]

In the GEMS activities, students can [23,24]

• observe with all senses and conclude according to observations.

• associate new situations and knowledge with old experiences.

• compare events and objects according to similarities and the differences in their qualitative and quantitative properties.

• organize, classify, and group objects and knowledge.

• be an active participant by touching, drawing, playing, questioning, communicating, sharing in the process.

• explore by playing games and experimenting.

• make intelligent predictions about the outcomes of events.

• gain basic science process skills such as applying new situations and drawing conclusions by interpreting information and methods.

GEMS activities provide students to use all basic science process skills to make their learning permanent, thus improving the quality and qualification of education as well as gaining students life long learning skills [25]

This study aims to investigate the effect of the GEMS Program which prepared for 6th-grade force and motion unit on students' basic science process skills and attitudes towards scientific method and opinions about the GEMS Programme.

METHOD

In this study, the "Pre-Test-Post-Test Semi-Experimental Test with Control Group which is within the scope of experimental research design was used (Balcı, 2015). There is a control group created by a neutral assignment and an experimental group. Pre-test and post-test are applied to both groups. The pattern adopted in the study is presented in Table1.

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Table 1. Experimental Design of the Study

Groups	Pre Test	Practice	Post Test
Experimental Group	BSPST, SCAS	SEC+ GEMS Supported Teaching and	BSPST, SCAS
Control Group	BSPST, SCAS	SEC	BSPST, SCAS

SEC: Science Education Curriculum; GEMS: Great Explorations in Mathematics and Science; BSPST: Basic Science Process Skills Test SCAS: Science Course Attitude Scale

The study groups of the research consisted of the 6th-grade students attending a secondary school located in the Altınordu district of Ordu province in the fall semester of the 2016-2017 academic year. Work with experimental groups to the secondary community and Grade 6 SEC MEB adapted GEMS Program administered 40 students, while the control group; 40 students do not apply the GEMS Program to the same secondary school. From to provide the internal validity group SEC teachers to be integrated to fit the prepared GEMS program to continue the control group MEB the meb learning teacher and allowed to do a different application. MEB 6 class SEC adapted GEMS was administered to one group.

Data Collection Tools

The research has a quasi-experimental nature. The research model, pre-test, and post-test were made with a quasi-experimental design with a control group. Basic Science Process Skills Test, Science Course Attitude Scale, were used as data collection tools.

A literature review was conducted for the development of "BSPST"[26] [27] [28] [29] [30] scales. Later SEC Located 6th grade "Force and Motion" gap-filling considering the gains of the topic in the unit, multiple-choice, matching, right-wrong, and classic that trial substances consisting of questions were written. Item form for a trial form is in the software stage; 6th-grade science textbook and 6th-grade science workbook, leaf test, and question bank, science teaching teacher books [31] were used. To ensure the content validity of the scale, a field educator and 3 experienced science teachers working in the MEB were consulted and evaluated in terms of scope and format. Within the framework of expert opinions, some questions were removed from the scale and some were corrected. Thus, a scale of 31 items consisting of 14 questions was created. For the pilot application of the experimental form, the students who have learned about force and motion were selected in the 6th grade science course. For this purpose, the pilot application of the 31-item trial form was applied to 6th

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grade (n =200) students randomly selected in two secondary schools in the 2016-17 academic year. The first is 80 (n = 80) students in a secondary school in Fatsa, Ordu, and the second is 120 (n = 120) students in a secondary school in Durağan, Sinop. Pilot study data were analyzed with SPSS 22.00 program. The item difficulty and discriminative indices of each question obtained as a result of the analysis of the final version of the test were calculated and a 25-item scale consisting of 12 questions was formed. 25 items from BSPST we have KR-20 reliability coefficient of 0.8174 was found reliable. The average difficulty of the scale was determined as 0.38. It is seen that the items that make up the test are of medium difficulty [32].As a result of the experts and the analysis, the validity and reliability of the scale were determined to be able to measure the gains in the "Force and Motion" unit. Reliability testing basic science process skills tested in the 2017-2018 academic year in the district in the 6th-grade level Altınordu front of the students was applied as pre-test and post test. Table 2 shows how the 12 questions in the Basic Science Process Skills Test for the Force and Motion Unit are represented according to the steps of the basic science process skills.

Table 2. Distribution of basic science process skills according to the test items.

Basic Science Process Skills	Question Numbers in "Basic Science Process Skills Test for Force and Motion Unit"
Observation	12
Classification	9
Measuring	4, 7, 8, 10
Data Interpretation	3, 5, 7, 8, 11, 12
Space / Time Relations	4, 7, 8, 10, 12

It is aimed to measure the attitudes of students towards science course and Nuhoğlu's (2008) attitude towards Science and Technology course has been used. This scale is a 2-topic scale that measures the students 'attitudes towards science and Technology course and the students' interests and attitudes towards the activities included in this course. The scale is a 3-point Likert type and consists of 20 items in total. 6 for SCAS's studies on validity and reliability, 7th and 8th adapted from the classroom[33]. In the results of the analysis, the reliability of KR-20 internal consistency multiple was calculated as 0.8739. As a result, it has been decided that the substances in the test used in the research will be used without any change. The scale was applied to students to be pre-test and final test.

Data Collection and Analysis

Statistical analysis of all the data obtained by the evaluation of the "Basic Science Process Skills Test" and "Attitude Scale" conducted before and after application to the groups was carried out with the help of the SPSS 22.00 package program. In the light of the data received from the BSPST, descriptive analysis was conducted for each level and group separately. Students' average scores for each SPS level were translated and interpreted as a percentage. Before statistical analysis, data distributions of BSPST and SCAS were examined and dependent and Independent t-test was applied according to the characteristics of the targets and groups to be measured.

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FINDINGS

In this section, the data collection tools of the research are "BSPST" and "SCAS" of Middle School 6th students statistical analysis results of the data obtained from the applicatio. The statistical between the experimental group where GEMS-based courses were administered and the control group where program-based courses were administered was tested in terms of BSPST pre-test scores.

Table 3. Independent T-Test Results Comparing Pre-Test BSPST Scores of Test and Control Groups.

Groups	n	X̄	Ss	t	p
Experimental Group	40	42.3250	10.74265	-.010	.992
Control group	40	42.3500	12.15614		

As shown in Table 3, there was no statistical difference between the preliminary test scores of the test and control groups This is an important finding for the research, showing that groups before implementation were equivalent groups in terms of pre-test scores. BSPST post-test points of experiment and control groups were analysed descriptively. The results are presented in Table 4.

Table 4. Independent t-Test Results Comparing The Post -Test BSPST Scores of Experimental And Control Groups.

Groups	n	X̄	Ss	t	p
Experimental Group	40	70.7000	12.68595	6.177	.000
Control Group	40	53.9250	11.57891		

When Table 4 is examined, it is seen that the arithmetic mean of the experiment group is $\bar{X}$=70.7000 and the arithmetic mean of the control group is $\bar{X}$=53.9250. Between groups, a significant difference was found in favor of the experimental group ($p<0.05$, $p=.00$). The statistical connection among the pre-test and post-test BSPST point of the control group in which the Program-based courses were processed was tested.

Table 5. Control Group Pre Test and Post Test Results of Dependent t-Test Comparing BSPST Scores.

Control Group	n	X̄	Ss	t	p
Pre Test	40	42.3500	12.15614	-18.068	.000
Post Test	40	53.9250	11.57891		

According to Table 5, the Pre-test arithmetic mean of the control group is $\bar{X}$=42.3500, post-test arithmetic mean is $\bar{X}$= 53.9250. A significant difference was found between the control group pre-test and final test scores ($p<0.05$, $p=.00$). The statistical connections among pre-test and post-test BSPST scores were tested in the experimental group where the SEC - based and GEMS-supported courses were applied.

Table 6. Experimental Group Pre Test And Post Test Results of Dependent t-Test Comparing BSPST Scores.

Experimental Group	n	x̄	Ss	T	p
Pre Test	40	42.3250	10.74265	-8.418	.000
Post Test	40	70.7000	12.68595		

According to Table 6, there is a significant difference among the test group pre-test and final test scores. Therefore, the applications of GEMS carried out in the Experimental Group. Descriptive analyses of Sub dimensions of BSPST posttest basic science process skills is presented in Table 7.

Table 7. Experimental and Control Group BSPST Sub Dimensions Descriptive Analysis Results.

Basic Science Process Skills	Number of Question	Experimental Group			Control Group		
		X̄	Ss	%	X̄	Ss	%
Observation	2	8.250	3.889	82.5	4.875	4.661	48.75
Classification	1	4.050	1.810	81	2.179	2.269	44
Measuring	4	20.250	5.878	81	12.500	6.304	50
Data Interpretation	6	45.800	12.376	70.4	26.825	10.415	52.5
Space/Time Relations	5	23.1250	7.042	77	15.500	8.243	48.8

According to Table 7, the average score, standard deviation and true answer percentage of the control group on the basic science process skills scale Control group BSPST sub-dimensions as a result of descriptive analysis, “Data Interpretation” sub-dimension was found to be the most accurate answer

According to Table 7, the average score, standard deviation, and true answer percentage of the experimental group Students on the basic science process skills scale. The statistical between the experimental group where the GEMS-based courses were administered and the control group where the program-based courses were tested in terms of SCAS pre-test scores.

Table 8. All groups Pre-Test Results of Independent t-Test Comparing SCAS Scores.

Groups	n	X̄	Ss	T	p
Control Group	40	42.2250	11.99463	-.426	.671
Experimental Group	40	41.2500	8.07576		

As stated in Table 8, there were no significant differences among all groups of pretest scores. This is an important finding and clearly shows that the attitudes of the groups related to the science course are similar to each other before implementation. The statistical relationship between the experimental group where the GEMS-based courses were administered and the control group where the program-based courses were processed was tested in terms of SCAS final-test scores.

Table 9. All groups Post-Test Results of Independent t-Test Comparing SCAS Scores.

Groups	n	X̄	Ss	t	p
Control Group	40	43.2250	8.72805	1.381	.171
Experimental Group	40	45.5750	6.29158		

As indicated in Table 9, there was no significant difference among all groups for post-test attitude scores. Therefore, it was determined that both groups did not affect increasing the students ' attitudes about the science course. The statistical connection among pre-test and final-test SCAS scores of the control group in which the Program-based courses are processed was tested.

Table 10. Dependent t-Test Results Where Control Group Pre-Post Test SCAS Point Are Compared. Pre-Post test comparison Related sample t test results in control group

Control Group	n	X̄		Ss	T	p
Pretest	40	42	.2250	11.99463	-.611	.545
Posttest	40	43	.2250	8.77802		

For the SCAS pre-test, the arithmetic average of the control group is $\bar{X}$= 42.2250, post-test arithmetic mean is $\bar{X}$=43.2250 .There is no significant difference among the experimental and control groups as shown in Table 10 for the attitude scores of the final test ($p > 0.05$, p=.545). The statistical connection among pre-test and posttest SCAS scores was tested in the experimental group where GEMS-supported courses were administered subject to SEC.

Table 11. The Results of The Dependent t-Test in Which The Pre-Test And post-Test Scores of The Experimental Group Are Compared.

Experimental Group	n	X̄	**Ss**	T	p
Pre Test	40	41.2250	45.5750	-4.343	.000
Post Test	40	45.5750	62.9158		

According to Table 11, the mean pre-test attitude point of the test group before the application is $\bar{X}$=41.2500 and the average of the final test attitude score after the application is $\bar{X}$=62.9158. Performed to determine statistical terms, the difference of the dependent t-test; at $p < 0.05$ level, since the experimental group pre-post test scores there is a significant difference between the attitude, Therefore, their attitudes about science in students of the experimental group conducted practices GEMS in a positive direction can be said to be effective. Content and descriptive analysis results were presented to reveal the opinions of the experimental group students on the GEMS curriculum.

CONCLUSION

This study aims to determine the effect of the GEMS program prepared according to the 6th grade “Force and Motion” unit on students’ basic science process skills and attitudes towards the GEMS program. It’s especially important to be gained basic science process skills which are the foundation of scientific literacy. In the research BSPST pre-test points of control and experiment group are examined. According to BSPST pre-test points there can’t be found a significant difference between groups (see., Table 3). Not having a difference between the groups’ pre-test points is a desirable situation. In the research, according to BSPST post-test points of the experiment and control groups, a significant difference is observed in favor of the experimental group in statistical size (see. Table 4). According to the post-test exam which evaluates basic science process skills in the “Force and Motion” unit,

students in the experimental group have been more successful than the students in the control group who took program-based courses. It has been observed a significant difference in students' observation, measuring, classification, number-space relationships and data interpretation skills in the post-tests. That shows the students in the experimental group have been had more increase in s basic science process skills which wanted to be measured. When the literature is examined, in the study conducted [34] who was investigated the effect of a program designed with the activities according to the GEMS approach on the students' basic science process skills showed that a significant difference was observed on observation, modeling, determining variables, drawing conclusion and interpretation skills in post-tests. [35]stated that the GEMS program will have a positive effect to gain basic science process skills in her study. Experiments in GEMS science activities give effective responses to students' feelings of wonder, increase the permanence of theoretical knowledge, and give a chance student to gain basic science process skills with hands on learning[36].

There can be seen the positive contribution of GEMS based activities on basic science process skills in the earlier studies[37,38]

As seen in [39,40,41] studies, student-centered and active learning applications such as GEMS provide effective conclusions in developing basic science process skills, valuing the science, and gaining the awareness of these issues while leading the students to investigate and inquiry. In the research, a significant difference has been observed in favor of post-test points between BSPST pre and post-test points for students in the control group in statistical size. Students in the control group were applied activities included in the books approved by MEB and were conducted the experiments by the statements of the teacher. It was assumed that students in the control group have a lower level of success because of not fulfilling the basic elements of basic science process skills and not inquiring. When literature is examined similar result was assumed in [42,43,44] studies.

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In the research, a significant difference has been observed in favor of post-test points between BSPST pre and post-test points for students in the experiment group in statistical size. Since GEMS activities were effective in gaining basic elements of the basic science process skills to students it was observed that SPS levels of the students in the experimental group increased in a month period. But here the teacher who internalizing the processes very well, being equipped, applying the creative activities to students, guiding students and positive attitudes in lessons was effective to gain students SPS in the experimental group. When the literature is examined,[45] address the importance of the teacher in their studies as well.

When experiment and control groups' pre and post-test results evaluate it is observed a significant difference between the points of both experiment and control groups in statistical size. However, when we compare the groups since the increase in the average mean of the experimental group is better than the control group, it can be said the development of the basic science process skills of the students in the experiment group who took the courses GEMS supported is better than from the students in the control group who took the courses program based.

Experiment and control groups' post-tests sub-dimensions show that students in the experiment group have a better understanding of all sub-dimensions of the basic science process skills than the students in the control group and they answered more accurately the questions in the test. A significant difference was observed between the experiment and control groups' points according to t-test results which evaluates the sub-dimensions of the basic science process skills such as observation, classification, measuring, data prediction, time/ space relationships. Students'points in the experiment group who were conducted GEMS supported education is higher according to the test BSPST which measures the sub-dimensions of SPS. This result shows that students in the experiment group learn the sub-dimensions of basic science process skills such as observation, classification, measuring, data prediction, time/ space relationships better. When literature is examined, stated that alternative teaching methods or the programs that support the curriculum such as GEMS are effective to investigate students' basic science process skills. [46,47,48]

According to the points of SCAS pre-test points of the students in the experiment and control groups who were involved in the research showed that the groups were equal to each other before the implementation (see., Table 8). It is observed that there is no significant difference between the points of SCAS post-test points of the students in the experiment and the control group (see., Table 9). As a result, it is not observed a significant difference between the attitudes towards science and technology between the experiment group which was conducted with SEC-based and GEMS supported courses, and the control group which was conducted with program-based courses. It is seen that there is no significant difference between the SCAS pre and post-test attitude points for the control group statistically. (see.,

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Table 10). The techniques or methods used in the implemented studies can negatively affect the students' attitudes in some situations. Studies that take place in a short period and the first encounter of the students with the new method can be shown as reasons among these situations [49]

Statistically, there is a difference between the attitude points of SCAS pre and post-test points of the students in the experiment group (see., Table 11). A positive development was provided with the students' attitudes towards science and technology in the experiment group after implementation thanks to the GEMS activities adapted to SEC compared to before implementation. As a result, it can be stated that GEMS activities increase students' attitudes towards science courses and science activities in a positive way. the teachers who were involved in the study stated that GEMS has an affirmative effect on increasing the students' interests and attitudes to the science course, on to make students compatible with the classroom and also GEMS activities provide to develop a positive attitude towards science course[50]. Put forward that GEMS activities affect students' interests and attitudes towards science courses, studying, and in-class behaviors in a positive way[51].

GEMS approach that builds the foundation of mathematics and science integration besides developing a positive attitude towards lessons will be gained students' basic science process skills which help to solve faced problems and make sense of life[52].

investigate students' opinions about GEMS based activities, students stated that activities were enjoyable and interesting, did not force themselves, and were clear and understandable[53]. search the ideas and the opinions of candidates of teachers on applying GEMS activities in science education and candidate teachers stated that GEMS activities had positive effects on students and were enjoyable and make learning easy[54].

According to the research findings and the conclusions, it is seen that the level of basic science process skills of the students who learned the 6th grade "Force and Motion" unit with GEMS activities which adapted to SEC are higher than the level of basic science process skills of students who learned the same subject with Science curriculum based lesson. Students took an opportunity to act like a scientist and had a chance to use observation, measuring, classification, and data prediction in the implemented activities. Furthermore, the research was effected also on observation, measuring, classification, number-space relationships, and data prediction. Statistically, the reason for not having a significant difference in attitude can be attributed to short research time in this kind of researches [55]. It was observed that students who were involved in the GEMS science and mathematics

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program were more interested in the course and feel enjoyable with the activities, at the end of the implementation an attitude scale applied to the experiment group showed that students had a positive increase on attitudes towards science course.

SUGGESTIONS

According to the results of the research, science and mathematics activities and activities in GEMS Science and mathematics program are more fun for students and make students want to learn more. For this reason, GEMS science and mathematics activities should be included in primary education Curriculums, or at least gems classes should be established at certain times in schools one day of the week and gems activities should be done. Based on GEMS Science and mathematics program, activities for different acquisition and units can be developed and the effectiveness of the activities developed can be examined. GEMS Science and mathematics program can be applied effectively with different disciplines other than science courses. Furthermore, the GEMS Science and mathematics program can be adapted to all levels of Education.

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