

EFFECT OF CREATIVE DRAMA METHOD IN SCIENCE AND TECHNOLOGY COURSE ON THE ATTITUDES OF PRIMARY SCHOOL FIFTH GRADE STUDENTS TOWARDS THE COURSE AND ON THEIR ACHIEVEMENTS

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The effect of using the creative drama method in science and technology course on the attitudes and achievements of students was investigated in this study. The research was carried out with 46 primary school fifth grade students. Of these students, 22 were female and 24 were male. The pre-test and post-test designs were used with a control group of the students in the research, 25 constituted the experimental group, while 21 constituted the control group. In the experimental group, the courses were lectured using the creative drama method. In the control group, however, the courses were lectured according to the traditional instruction methods. For this purpose, the students in the experimental group were provided with a drama education before the application. In the study, science and technology courses were applied in the unit of 'living things and life learning area, let's travel and learn the world of living things'. The unit was lectured in 28 course hours in both groups. "Science attitude scale" and "achievement test for science and technology courses" that were developed by the researchers were used as the measurement instruments. The attitude scale was applied to the students as pre-test and post-test. However, the achievement test was applied as only a post-test. The Mann Whitney U-test was used for data analysis. A significant difference was found between the experimental group and control group in terms of the total scores obtained from the achievement and attitude tests. In addition, whether there was any difference between attitude and achievement in terms of gender, was examined, and no difference in attitude and achievement was found.

Keywords: Science and Technology Teaching, Creative Drama, Academic Achievement, Attitude

The basic aim of education is to assure that the youth understand the problems which they may encounter in the real world and to supply them with behaviours and skills that they are likely to need in coping with these problems. Thus, learners can develop sensitiveness skills, for their improvement, for consciousness, knowledge and comprehension; and

decisiveness in behaviours and personal life and for a better environment (McNaughton, 2004). Therefore, the process of education should improve students' self-confidence and motivation. Learners should be guided in a manner in order for them to research on their own and question the issues rather than constantly be in need of receiving. They are active both physically and mentally in this process.

Science curriculum encourages students to understand how science works and it predicts that they become enthusiastic about studying science actively. Science teaching is more complicated than just making students involve only in class- presentation and course books. It necessitates students to learn by actively participating, doing and experiencing. It also leads learners to mental- based discoveries forcing them to think. Reflective investigations, forming hypotheses and questioning, stimulate the sincere interest in topics and curiosity; thus they encourage learners to learn. Students build, regulate and expand their basic knowledge and their understanding of science upon such connected experiences; that is to say, they construct knowledge (Kelly, 2000). The use of restructuring processes in both education and scientific perspectives is quite effective in creating new ways in creative thinking and speaking (Howard-Jones & Winfield & Crimmins, 2008). According to constructivism, learners construct their knowledge in interaction with the physical and social environment. The student-student interaction or student-teacher interaction composes the learning material. The interaction forms students' cognitive development and also contributes to the process of their spiritual development. It also generates success and positive attitudes on the part of students (Liang & Gabel, 2005). The aim in structuralism is to instill in students such skills as doing research, discovering ways of reaching knowledge, organising knowledge, and generating solutions to the problems they may face. Therefore, group works, projects, experiments or research studies and problem solving activities for real life problems are done (Alrutz, 2004).

Models, selected in teaching especially for primary education stage should make science studies meaningful. It should be ensured that students make associations with other topics in the curriculum in a different and interesting way. The methods chosen should assure active participation, be application-oriented, be supported by project work appropriate to the curriculum, and involve physical, geological and natural sciences (Greene, 1991). The teaching process should be student-centred, and frequently employed applications of traditional curricula should not be included (Pisano, 2009) because while student-centred methods lay less emphasis on keeping scientific facts in mind, they mainly emphasise students' self-discovering the world more and more and their researching and learning more meaningfully through their self-research. The educational process presents a classroom environment where students begin to discover the real world through scientific experiences. Thoughts are organised and confirmed by oral and written communication. In such an environment students may enjoy science, form positive feelings and improve their internal motivations. Such environment may contribute to constructing a general scientific schema; and thus continuity is secured in beliefs and attitudes and they may become more stable (Jalil & Abu Sbeih & Buogettif & Barakat, 2009). Apart from that, permanence in learning increases and students' enjoyable participation in class is actualised (Yaman, 2005). In this way, the roles that students play in the educational process are established (Triantafyllakos & Palaigeorgiou & Tsoukalas, 2008). Weimer (2002) attracts attention to the significance of communication in classroom environment and stresses that

activities done should be encouraging and interaction should be continual (Avard, 2009).

Today computer software satisfy most of our children's interactive inadequacies. In an era when technology is the second-hand medium of communication, this case serves as an opportunity for our children to learn social learning and face-to-face critical thinking skills. Games through drama, creative drama and theatre plays may have positive roles in facilitating such aims (Furman, 2000).

Drama has been transferred into the field of education through the principles of "being student-centred", "activity-based" and self-expressive" (Bolton, 1985). Inclusion of drama in education and thus re-creation of topics by integrating them secures permanent learning and encourages students to learn (Andersen, 2004).

Drama method in education is very important in that it facilitates learning by doing and experiencing, it is based on experiences, it enables active learning, makes abstract concepts concrete and it is based on game-like processes (Yaman, 2005).

The aim is to make students conscious of interpersonal differences, differences stemming from the self, their own prejudices and their responses they make in situations they roleplay. Besides, students can understand interactions with individuals different from themselves, the prejudice, stereotypes and languages; and thus they can empathize and become aware of their thoughts (Tromski & Doston, 2003).

Drama is also an effective method in facilitating such basic skills as reading (Rose & Parks & Androes & McMahan, 2000). It develops a wide range of skills from communicating problem solving, making sense of knowledge to being creative (Bolton, 1985).

Teachers would like their students to learn complex topics, develop thinking skills by making cautious evaluations in the decision-making processes, and to perform their citizenship duties. When teachers apply drama technique and the process of evaluation accordingly, students will have the opportunity to display their personalities, skills and knowledge; and thus they will be able to demonstrate their creativeness and discover the topics in accordance with the situations. And most importantly, their self-confidence will develop. For that, teachers must create the circumstances suitable for the drama. Working in groups generally gives students social skills such as being a member of a group and communicating with others (Bolton, 1985; Morris, 2001).

Employing drama / dramatisation in teaching the concepts of Science/Chemistry dates back to earlier periods in history. Bohr's students inspired from Goethe's "Faust", and wrote the play "Blegdamsvej Faust" and put on the stage for a better understanding of the availability of neutron. Inspiring from that method, it was ensured that physics course was made simpler, the level of topics was made accessible and analogy to drama was formed (Pantidos, Spathi & Vitoratos, 2001).

That Harriet Findlay-Johnson, a village school teacher, roleplayed in an imaginary play in the class and then included the students in the play by permitting them to role-play, is an example known in history concerning the drama method (Bolton, 1985). In science course especially, students need various activities for a better understanding. In the process of creative drama, many such activities are included. In this way, learning by experiencing is ensured. For an individual whose science and technology are literate or who is scientifically literate to be able to understand the nature of science and scientific knowledge and thus apply them, using the scientific process skills and making associations between the society and the environment in this

way, and possessing scientific attitude and values may be facilitated by frequent use of drama in this field (Özdemir & Üstündağ, 2007).

Different techniques are available for use in drama technique. Creative drama is one of the drama-assisted learning activities in which a leader and his or her followers, and situations, where real or imaginary human experiences are reflected, represented or role-played, are created. Creative drama, in which cognitive and physical activities are connected, is a process-oriented experience in which improvisations with all the children's participation are available. Its aim is to have students set up connections with social happenings and to ensure that they employ the connections not only with the drama but also with their daily life. The long-term benefits of creative drama include developing problem-solving and cooperation skills, feeling of existence, empathy, the ability of postponing a pleasure and adding creativeness in activities (Pinciotti, 1993).

Cockett (1999) categorises the skills that creative drama technique facilitates in a study which analyses primary education students' learnings through drama technique overtly and covertly. Accordingly:

1. *Knowledge of Materials*: It develops students' skills of obtaining the material that they wish to use in drama technique, understanding the topic and outlining it with their knowledge, and making use of their personal experience and cultural knowledge.
2. *Group skills*: They develop the skills of social interaction and cooperation, harmonising with other group members, fulfilling the in-group responsibilities, and supporting other group members.
3. *Impressive skills*: They develop students' skills of expressing through gestures and mimicry and flow of them, adjusting the voice according to the place used and speaking fluently, improving spontaneous interaction, using the physical space between humans and substances, being able to create a new air and mood and communicating with others in drama.
4. *Knowledge of Dramatic Form*: It develops the skills of forming and sustaining the character, developing the story and the scenario, designing the dialogues, understanding and using the improvised fiction, knowing the dramatic forms and styles (such as harmonious to nature, conventionalise, symbolic, etc.).
5. *Thinking Skills*: They develop the skills of listening to the participants and learning from them, listening for opinions and contributing to them, imagining the probabilities and illustrating them, expressing the attitudes and values, observing in a critical way and reflecting it (Cockett, 1999).

Dramatisation and narrating are the techniques frequently used for developing early childhood period children's skills. Students develop their literacy skills, social skills and creativeness through these techniques. Providing these skills is mostly found in student-centred curricula ensuring students' free participation in activities and their direct participation in the process (Wright & Bacigalupa & Black & Burton, 2007).

Another technique is role playing. According to the British Government National Strategy of Literacy, drama technique has been used with students at the second stage of primary education in the teaching of English since 2003/04. Therefore, they established a department through which they could attain the objectives and aims of drama method. In the education conducted with the 11-14 age group children, students learn to develop various drama techniques so as to discover being in different roles in different situations in the 7th year; they learn to present and evaluate their performance in

cooperation and to discover the personalities of characters and to associate between them in the 8th year, and in the 9th year they learn to compare different interpretations in a game and to develop them. In this curriculum, in which English education and drama were connected, using drama was observed to have positive effects in students' writing habits in many fields and topics and in their creativeness, in teachers' observations, motivation, and attitudes and in their self-perception (Pitfield, 2006).

According to the science teachers, if employed in different techniques, the drama method is capable of instilling in students such competences as understanding quickly, assuring permanence, being able to produce more, achieving in examinations, developing a positive attitude towards science, making deductions, paying more attention, being active, and assuring learning by entertaining and experiencing (Yiğit & Tural & Alev & Aydın, 2009). In a case study by Bencze and Upton (2006), where the causes of teachers' low self-competence in science are researched, it was observed that using the drama technique both increased teachers' self competence and students' positive attitudes towards science. Butler (1989) points out that it enables students to look at events especially from different points of view (Alrutz, 2004).

New examples should be developed nowadays so as to correct the wrongly known and applied activities in using the drama method. The educational needs should be met and insufficiencies of teachers of various fields in creative drama- which includes most of the techniques in which students are put in the centre of the learning process- should also be supplied (Özdemir & Üstündağ, 2007).

It is important for students who learn better through games or game-like activities that curriculum designers and educators understand the value of drama (Furman, 2000). Skills that are facilitated through the drama method are effective in enabling the students to solve their academic and behavioural problems and in making them develop positive attitudes towards the course in addition to entertaining them (Bolton, 1985; McCaslin, 1990; Rose & Parks & Androes & McMahan, 2000; Çokadar & Yılmaz, 2010).

Basically, this research aims at determining the effects of using creative drama in primary education 5th grade course of Science and Technology on students' attitudes and achievements. Answers are sought to the following questions:

- Does the method of creative drama and teaching conducted through Science and Technology course curriculum have significant effects on students' attitudes towards the course of Science and Technology?
- Does the method of creative drama and teaching conducted through Science and Technology course curriculum cause significant differences in students' Science and Technology course achievement?
- Do the students' attitudes towards Science and Technology course and their academic achievement in the course differ on the basis of gender?

Method

Research Model An attempt is made in this study to research and determine the effects of using creative drama on students' attitudes towards Science and Technology course and on their academic achievements. Therefore, this

research employs an experimental model. The research model was established on the basis of pre-test/ post-test control group design.

Study Group. The study group was composed of 46 fifth graders. 22 were girls while 24 were boys. Classifications of the participants into experimental and control groups were conducted at random. Classes were taught through creative drama in the control group while they were taught through the methods, techniques and activities present in the curriculum of Science and Technology (on the basis of structural approach). Experimental group, to which creative drama was applied, contained 25 students but control group, to which Science and Technology course curriculum was applied, contained 21 students. For the purposes, the experimental group students were offered drama education prior to the application. The application was made in the learning field of Living Things and Life in the unit of “Let’s Get to Know the World of Living Things” in Science and Technology course. The unit was covered in 28 hours in both groups.

Data Collection Tools. “Science Course Attitudes Scale” and “Science and Technology Course Achievement Test” which were developed by the researchers were used for the evaluation. Attitudes scale and the achievement were given as the pre-test and post-test to the students.

Science Course Attitudes Scale. The current scale was prepared on the basis of the 5-pointed Likert type scale used in Germann’s study. Some of the items in the new scale, which was based on the structure of Germann’s scale were developed by Ören (2005). So as to determine the validity of the attitudes scale, factors analysis was employed. Cronbach alpha internal consistency coefficient was calculated for the scale and it was found to be 0.925.

Science Course Achievement Test. The achievement test developed by the researchers was composed of 20 questions. Item and test analyses were performed in the pre-application. Cronbach alpha coefficient was found to be 0,78. The value was sufficient to use the test in the research.

Data Analysis

Analyses of the data demonstrated that scores received from the “Science and Technology Course Attitudes Scale” and “Academic Achievement Test” were not compatible with the normal distribution. Therefore, nonparametric statistical analyses were preferred. Accordingly, Mann Whitney U-test was utilised for the comparison of experimental and control groups’ attitudes and academic achievement scores.

Application. This part describes the way 5th grade unit “Let’s Get to Know the World of Living Things” was taught to the experimental group through drama method.

The 1st Session: Methods-Techniques Employed: Procedural drama and sighthseeing-observation. Gains Determined: Introduction between students and the leader, giving consciousness through drama method, improving interaction and communication between students, and introduction to procedural drama. At the warm up and preparation stage “motion-name” and “rings inside one another” activities were done. At the roleplaying stage, the students were presented properties associated with a forest and a country at the entrance of the forest, and they were asked to roleplay upon being asked some questions. At the evaluation stage drama was introduced to them by asking what the thing they were doing was. Finally, the session ended by relaxing.

The 2nd Session: Methods-Techniques Employed: Creative drama and sightseeing-observation. Basic Gain Determined: Ensuring that students are aware of the living areas and the living things around. At the warm-up and preparation stage activities of “walking in compliance with the instructions” and “working with eyes closed” were done. At the roleplay stage, in connection with the previous session, roleplay to show how destruction of the living areas affects the life of living things was done. Afterwards, a performance assignment was given to the students to compare the living areas of living things with their owns. The session ended with a description of that day’s experiences.

The 3rd Session: Methods-Techniques Employed: Creative drama. Basic Gain Determined: Ensuring that students classify living creatures into groups and sub-groups on the basis of similarities and differences. At the warm up and preparation stage students watched picture slides of animals. At the roleplay stage they were grouped and were asked to roleplay the daily life of an animal they chose. Then activities of “forming a table of nutrition” and “past-present-future” were done. Finally, at the evaluation stage, the students were asked to compare the animals they had roleplayed at the beginning of the class and they were asked to classify the animals according to the nutrition style.

The 4th Session: Methods-Techniques Employed: Creative drama. Basic Gain Determined: Forming a model of nutrition chain showing the relations between living things in a living area and knowing how man and society affect the environment. At the warm up and preparation stage, the students were asked to do the activity of “find your partner” and then they watched the presentation of nutrition chain. At the roleplay stage, the nutrition chain was observed in the slide and watched, and the impacts of breaking a ring of the chain were discussed.

After that a slide showing the harm, human beings giving to the nature and the consequences were watched. Then the students got into groups and roleplays and discussions concerning the changes occurring in the soil, water and air due to humans were performed. At the sharing stage, comments were made about the day, and they were assigned to prepare a graph showing before, the moment and after they role-play as the performance assignment.

The 5th Session: Methods-Techniques Employed: Creative drama. Basic Gain Determined: Being aware of the animals becoming extinct or at risk of extinction in our country due to human effect. At the warm up and preparation stage the game of “seizing the throne” was played. Following that, a presentation about animals becoming extinct was watched. At the roleplay stage, the mask of an animal becoming extinct was made, then students went to the garden and they were asked to roleplay a touristic visit to the country of the animal becoming extinct. As the evaluation, what was done during the day was repeated and experiences were shared, and thus the session was ended.

The 6th Session: Methods-Techniques Employed: Procedural drama. Basic Gain Determined: Gaining awareness concerning their perception. At the warm up and preparation stage: the “cat and mouse” game was played. At the roleplay stage the students were asked to act like soil, air, water and fire with a music. Afterwards they were asked to give objects they picked in the garden to their classmates whose eyes were closed for perception work. At the evaluation stage, they were asked to draw pictures of what they felt through their perception. At the end of the session, experiences were shared.

The 7th Session: Methods-Techniques Employed: Creative drama and sightseeing-observation. Basic Gain Determined: Learning Atatürk’s statements about environmental awareness. At the warm up and preparation

stage the students were asked to make buildings by using their bodies. At the roleplay stage they were asked to make negotiations with leaders of the countries which they had roleplayed in the first session and to quote from Atatürk's essay entitled "mobile villa" Then they were asked to watch the presentation called "Atatürk and the Mobile Villa", and they were told the stories of how Atatürk Farm was built. At the evaluation stage, they were asked to write a "letter to the future" describing what they will do in the future to overcome the problems arising in their country until the end of the session. Then the session ended through sharing of the experiences.

Findings and Interpretations

In this part, data obtained through Science Attitude Scale and Academic Achievement Tests which were applied to the experimental and the control groups before and after the application were analysed via statistical techniques. The findings obtained were then tabulated and interpreted on the basis of analysis results.

Table 1. U-test Results of Pre-test Scores Concerning Students' Academic Achievement

Group	n	Mean Rank	Mean Rank Total	U	p
Experimental	25	25,36	634	216	0,291
Control	21	21,29	447		

The Mann Whitney U-test results of pre-test scores concerning the students' academic achievement are shown in the table. Accordingly, no significant differences were found between the experimental and the control group before the experimental procedure ($U=216$; $p>.05$). The groups may said to be equivalent at the beginning.

Table 2. U-test Results of Pre-test Scores Concerning Students' Attitudes towards Science and Technology Course

Group	n	Mean Rank	Mean Rank Total	U	p
Experimental	25	22,54	563,50	238,5	0,594
Control	21	24,64	517,50		

The Mann Whitney U-test results of the scores received by the experimental and control group students from the Science Course Scale are shown in the table. Accordingly, no significant differences were found between the experimental and the control groups' attitudes towards the course of Science and Technology before the experimental work ($U= 238.5$; $p>.05$).

Table 3. U-test Results of Post-test Scores Concerning Students' Attitudes towards Science and Technology Course

Group	n	Mean Rank	Mean Rank Total	U	p
Experimental	25	27,52	688	162	0,026
Control	21	18,71	393		

At the end of the seven- session education, a significant difference was found between the two groups ($U= 162$; $p<.05$). Considering the order averages, it becomes evident that the experimental group students' attitudes towards Science and Technology course are higher than those of control group students. This result shows that creative drama is effective in developing a positive attitude towards Science course. This finding is supported by the findings of other studies demonstrating that in a curriculum where drama is connected to education students' interests are caught and the topic become more interesting, thus the learning environment is made more enjoyable and students develop a more positive attitude towards the science course (Bolton, 1985; McCaslin, 1990; Rose & Parks & Androes & McMahon, 2000; Bencze & Upton, 2006; Pitfield, 2006; Yiğit & Tuğral & Alev & Aydın, 2009; Çokadar, & Yılmaz, 2010).

Table 4. U-test Results of Post-test Scores Concerning Students' Academic Achievement in Science and Technology Course

Group	n	Mean Rank	Mean Rank Total	U	p
Experimental	25	28,24	706	144	0,008
Control	21	17,86	375		

At the end of the seven- session education, a significant difference was found between the two groups ($U=144$; $p<.05$). Considering the order averages, it becomes evident that the experimental group students' achievement in Science and Technology course are higher than that of control group students. This result shows that creative drama is effective in increasing academic achievement.

Integrating the topics with real life and restructuring them secures permanent learning in teaching through drama. It may be said that making topics more understandable also helps students solve their behavioural and academic problems (Bolton, 1985; McCaslin, 1990; Rose & Parks & Androes & McMahon, 2000; Pantidos & Spathi & Vitoratos, 2001; Andersen, 2004; Çokadar & Yılmaz, 2010). Moreover, this result may also be interpreted that students' developing positive attitudes towards the course affects their academic achievement. Besides, students' positive attitudes towards the course also affect their interest and participation in the course (Pitfield, 2006; Çam & Özkan, & Avinç, 2009). The fact that this case affects academic achievement is also inevitable (Yiğit & Tuğral & Alev & Aydın, 2009).

Table 5. U-test Results of Post-test Scores Concerning Students' Attitudes towards Science and Technology Course According to Gender

Group	n	Mean Rank	Mean Rank Total	U	p
Girls	22	22,95	505	252	0,791
Boys	24	24,00	576		

Following the experimental work, no significant difference was found between girls and boys in terms of their attitudes towards science and technology course ($U= 252$; $p>.05$). Gender differences arise in education as factors affecting many other factors such as individual differences based on teaching methods, learning styles, interest in and attitudes towards a course (Chen, Chen, Chang, Lee & Chen, 2010). The reason for having no differences in terms of gender in our finding was that the teaching method laid emphasis on group sharing in classroom environment without considering gender differences.

Table 6. U-test Results of Post-test Scores Concerning Students' Academic Achievement in Science and Technology Course on the Basis of Gender

Group	n	Mean Rank	Mean Rank Total	U	p
Girls	22	23,36	514	261	0,947
Boys	24	23,62	567		

The Mann Whitney U-test results of the male and female students' academic achievement scores following the experimental work are shown in the table. Accordingly, no significant differences were found between students in terms of gender following the experimental work ($U= 261$; $p>.05$).

Conclusions and Discussion

According to our findings, Science and Technology course taught through creative drama affects students' attitudes towards the course in a positive way. Researchers who focused on science courses, taught through drama, found that drama technique affected students' attitudes towards science in a positive way, it assured sharing information between students, caused deeper learning, and that it enabled students to understand and analyse personal and social values (Keech, 2001; Alrutz, 2004; Fitzgerald, 2007). Positive attitudes influence students' interests and participation in the course (Pitfield, 2006; Çam & Özkan, & Aving, 2009).

Application was done in the learning field of Living Things and Life, the unit of "Let's Get to Know the World of Living Things "of Science and Technology course. The findings showed that teaching Science and Technology through drama method improved students' academic achievement. It is known that developing a positive attitude towards a course improves academic achievement (Papanastasiou & Zembylas, 2004; Diseth, 2007). This finding is parallel to the one obtained by Çokadar and Yılmaz (2010) in their study where they employed creative drama in teaching Ecosystem and Matter Recycle with 7th graders. Apart from those, Alrutz (2004) observed a teacher in his class where he used drama in teaching

Science classes; and found that students learnt and comprehended the basic concepts of circulatory system through role-playing more easily. This affects students' academic achievement in a positive way.

Following the experimental work it was found that students' academic achievement and attitudes did not differ on the basis of gender. Pinciotti (1993) suggests that creative drama should be conducted by improvising children's process oriented activities and by joining them with cognitive and physical games. It is also suggested by the same researcher that anything that is done individually in drama should be connected with the group and be shared. Briefly, gender discrimination is ignored in class. One of the most important features of drama method is that it is fun (Locke & Ossont, 2007). All the male and female students in the classroom said that they had fun in topics that were presented through drama method (Pantitos, 2001). That the results concerning the attitudes towards and academic achievement in Science and Technology course did not vary on gender basis, may stem from the fact that the sessions were conducted through drama method.

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