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An Investigation into the Problems of Turkish Science Teachers in Science and Art Centers: The Case of Kırkkale and Giresun Science and Art Centers

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Abstract

Within the scope of educational programs in the Science and Art Centers in Turkey, teachers try to develop programs for determining individuals' readiness level, orientation, support education, developing awareness of individual talents and special talents. The aim of the present study is to identify the problems that Turkish science teachers encounter within this process. The research which employed one of the qualitative methods, the interview, was carried out in January, 2009. The participants were 4 science teachers working at Kırıkkale and Giresun Science and Art centers (SAC). The data were collected by means of standardized open-ended interview technique. The most significant result of the study illustrated that teachers believe there should definitely be an educational program, but it should be flexible enough.

Keywords: Science education, Science Teachers, Science and Art Centers

JEL Codes: C11, J12

Introduction

Science and technology education is delivered effectively not only at primary level but also at every level of education. One of the places that these practices are held is the science and art centers. In order to determine the students who will attend the science and art centers, the parents and pre-school education institutions' teachers provide their opinions for pre-school age children. As for the primary school students, the primary school class and branch teachers provide their opinions. In the case of high school students, the class and guide teachers of the class as a committee make the diagnosis (MEB, 2007).

Primary and secondary school students admitted to science and art centers continue formal education with their peers in the schools they are registered to. The education that will enable them to become aware of their individual talents and help them develop and use this capacity to its full potential is given by the centers. Education delivered in these units is shaped on the basis of students' interests and needs (MEB, 2007). Students who enroll at the

science and art centers are first admitted to an orientation program. The aim of this stage is to help students learn about the unit, and the activities to be performed. Later, students are admitted to support education program and activities involving communication skills, group work techniques, learning methods, problem solving techniques, scientific research techniques, foreign languages, computer and social activities are implemented.

After this program, they are admitted to developing awareness of individual talents, development of special talents, project development and management programs respectively (MEB, 2007). However, some problems may be encountered during the implementation of these programs. For example, Gökdere and Çepni's study (2004, 2005) demonstrates the in-service needs of science teachers of the gifted students. This study reported that science teachers especially wanted to be informed of project-based learning approaches, access to periodicals, modern teaching theories and laboratory approaches. In addition, the reflections of the seminar studies formed on the basis of the

specified needs on the teaching environment were looked into. Gökdere, Küçük and Çepni (2004) investigated the extent to which educational technologies are used in the teaching of the gifted students and the effectiveness of this education. They found out that teachers could not relate technological materials with educational technology. Besides, Boran and Aslaner (2008) pointed to the importance of organizing a variety of activities for the education of the gifted and exemplified problem-based educational activities involving mathematics topics. Demirbaş (2009) investigated the science and art center students' images of scientists. At the end of the study, it was emphasized that these gifted children may be the scientists of the future and some recommendations were given on how to shape the educational approaches in these centers.

As for Gentry, Rizza and Gable's (2001) study, the urban and suburban gifted students' attitudes towards classroom activities were analyzed. It was understood that those who lived in the suburbs were less interested in the studies while those who lived in the city found the activities more interesting. In Hertzog's (2003) qualitative study, the reflections of the previous studies on gifted student education centers to the real life were determined and evaluated through interview questions.

Hong and Aquilino's study (2004) compared the students who were successful, creative and normal at math in terms of cognitive and motivational aspects. In the research no difference was observed in terms of students' belief in their abilities. It was observed that students who had high academic and creative competence had high mathematics competency and self-efficacy. Ataman (1982) mentioned the qualities of a gifted student and highlighted what students, parents and teachers should do in this respect.

An analysis of the previous studies shows that different results have been obtained regarding the gifted and talented students. The present study aims to identify the problems of science teachers at science and art centers during the determination of readiness levels, orientation, support education, awareness of individual

talents and development of special talents programs.

Research Model

One of the qualitative research methods, the interview method was employed in order to demonstrate the problems encountered by science teachers. Since the aim of qualitative research is not generalization but a highly comprehensive analysis of the issue (Yıldırım and Şimşek, 2000), the present study scrutinizes into science teachers' opinions on the process. The participants of the study which was conducted in January 2009 were two chemistry and two physics (2 male, 2 female) teachers from Kırıkkale and Giresun science and art centers. These teachers implemented the science lessons in the centers.

Data Collection Instruments and Data Analysis

In data collection, standardized open-ended interview method was employed. The semi-structured questions prepared by the researchers comprised 2 sections: the demographic information and open-ended questions. The demographic information section included information on gender, years of service and the education degree. The open-ended section included 11 questions. In order to maintain the content validity of the prepared questions, expert opinion was consulted. Each question was organized on the basis of expert opinion. In this respect, the science teachers were asked the following questions:

1. Individualized programs are required when performing activities with your students. What kind of activities do you organize in order to ensure this?
2. What are the problems you encounter in determining your students' cognitive, affective and psychomotor development?
3. Do the activities that you perform in the center (SAC) run in parallel to that of formal education institutions? What are the difficulties that you encounter in this process?
4. What are the problems that you encounter in the process of communication in the teacher-parent-Science and Art Center circle?
5. Can you reach the necessary measurement instruments at every stage of the student

evaluations? What are the difficulties that you encounter in this process?

6. What are the problems you encounter in the orientation period? What kind of activities could make this period more effective?

7. When giving support education, carrying out "communication skills, group work techniques, problem solving techniques, etc." activities are required. To this end, what kind of activities do you carry out? What are the problems you encounter when carrying out these activities?

8. In discovery of individual talents activities, "project preparation, forming interdisciplinary relationships, and development of creative activities" are required. To this end, what kind of activities do you carry out? What are the problems you encounter in this process?

9. At the stage of developing special talents, "making projects specific to the individual and making the individual aware of his/her interests and talents" is aimed at. To this end, what kind of activities do you carry out? What are the difficulties that you encounter in this process?

10. At the stage of project production and preparation, "an original project should be prepared and presented". To this end, what kind of activities do you carry out? Please give information on the problems you encountered in the project development process.

11. How should the program to be applied in Science and Art Centers be characterized? Please express your opinions.

Within the scope of the project, data collected through the standardized open-ended interview were coded independently by two experts and some themes were formed. In the same way, these data were analyzed, the (f) frequency distributions were obtained and the teacher opinions supporting the analysis results were investigated.

Findings

The findings obtained within the research were structured on the basis of the open-ended questions directed to the teachers. The teachers' responses to each question are analyzed in the following section.

Question 1. Individualized programs are required when performing activities with your

students. What kind of activities do you organize in order to ensure this?

Table 1. Activities preferred by the teachers

The used activities	f
Experiments	3
Project	2
Drama	2
Computer-aided Presentations	1
Brainstorming	1

Out of the participants, 3 reported that they used experiments, 2 reported doing projects, 2 reported doing drama, 1 reported doing brainstorming and 1 reported doing computer-aided presentations as individualized programs. Below some of the teachers' opinions are provided:

"... first of all, I give various topics to the students, they research these topics, I make use of drama and brainstorming as well. Also they design and carry out experiments."

"Initially I make them do personal research and make them dramatize the research results. In addition to this, I ask them to prepare slides and make them present and apply these topics and experiments."

Question 2. What are the problems you encounter in determining your students' cognitive, affective and psychomotor development?

Table 2. The problems encountered in activities aiming to identify cognitive, affective and psychomotor development

Problems Encountered	f
Acquisition of basic concepts	1
Acquisition of psychomotor skills	1
Lack of a certain framework	1
I do not encounter any problems.	2

The participating teachers reported problems in the following areas: acquisition of basic concepts (1), development of psychomotor skills (1), and lack of a certain framework (1). Two teachers reported that they did not

encounter any problems. Below, the teacher opinions can be found:

"... the greatest difficulty is the lack of a program..."

"There aren't many problems, but we sometimes experience difficulties in the development of psychomotor skills appropriate to the student's age and the acquisition of various concepts."

Table 3. The congruity between the activities in the center and the formal education institutions and the encountered problems

Situation	f	Problems Encountered	f
Yes	4	Moving on to higher level topics during the enrichment of the topics	1
		Inability to find different and original activities	1
		Lack of branch teachers	1
		I do not encounter any problems.	1
No	0		

Of the participants, 4 reported that they ran parallel to the formal education institutions. The problems encountered in this process are listed as "Moving on to higher level topics during the enrichment of the topics (1), "Inability to find different and original activities (1" and "Lack of branch teachers (1)". One of the teachers stated that s/he did not experience any problems. Below the teacher views are presented:

"Yes, I run parallel to the schools when preparing these activities but I enrich the topics. In this process, while the topics are enriched sometimes I have to pass on to the upper classes' curriculum. This might result in student's boredom in the next year."

"I implement essentially parallel but enriched activities." I did not encounter any problems in this process."

"... I do not experience any problems."

Question 3. Do the activities that you perform in the center (SAC) run in parallel to that of formal education institutions? What are the difficulties that you encounter in this process?

"They are almost parallel to each other. The greatest problem is that my branch is chemistry and I have to teach biology, too since there is no biology teacher."

"... it runs parallel to school curricula. The basic problem is I run out of resources for performing more enriching activities. When the same school activities are done students get bored."

Question 4. What are the problems that you encounter in the process of communication in the teacher-parent-Science and Art Center (SAC) circle?

Table 4. The problems encountered in the communication process in the Student-Parent-Center (SAC) circle

Problems Encountered	f
Students' absenteeism problem	2
Students' private course problem	2
The attitudes of the parents who have not understood the importance of SAC	2

The participants reported the following problems: student absenteeism (2), private course problem (2), and negative attitudes of the parents who do not understand the importance of the center (2). Below some of the

teachers' opinions are provided: "...Sometimes absenteeism might be problematic, though to a certain extent. However, we can solve it immediately..."

"...some children attend private courses and therefore can do absenteeism..."

"...especially in the 7th grade, parents ask the teachers to solve test problems in the class. This causes problems..."

Question 5. Can you reach the necessary measurement instruments at every stage of the student evaluations? What are the difficulties that you encounter in this process?

Table 5. Access to the necessary student measurement devices and the encountered problems

Situation	f	Problems Encountered	f
Yes	4	I do not encounter any problems.	4
No	0		

All of the participating teachers reported that they had access to the necessary measurement devices and none encountered any problems within this process. Below some of the teacher opinions are listed:

"... No we don't have any problems in this respect."

"We have access to measurement devices. I cannot say that we have any difficulties in this process."

Question 6. What are the problems you encounter in the orientation period? What kind of activities could make this period more effective?

Table 6. The problems encountered in the adaptation period and the activities

Problems Encountered	f	Activities done	f
Yes	0		
No	4	Introduction of the unit	4
		Learning about the students	2

None of the participants reported any problems related to the adaptation period. In this process, the introduction of the unit (4) and the identification of students' interests and talents (2) are performed. Below some of the teachers' ideas are listed:

"I did not encounter any problems in the orientation period. In this process, we first introduce the unit and then make some experiments in order to discover students' interests and talents..."

"...we both introduce the unit and identify the topics in which students are interested. There

was no problem in the orientation period as well."

Question 7. When giving support education, carrying out "communication skills, group work techniques, problem solving techniques, etc." activities are required. To this end, what kind of activities do you carry out? What are the problems you encounter when carrying out these activities?

Table 7. The activities carried out in the support education process

Activities Done	f
Drama	2
Poster works	1
Project works	1
Games	1
Model preparation	1
Experiments	1

Table 8. Problems encountered during the support education process

Problems Encountered	f
Crowded classes	2
I do not encounter any problems.	2

The participating teachers reported doing drama (1), poster preparation (1), project preparation (1), games (1), model preparation (1) and experiments (1) in this process. In the same way, two of the teachers reported that crowded classes posed a problem. Two teachers reported that they did not encounter any problems. Below some of the teacher opinions are listed: "...in this process I do drama activities, I make them prepare posters and models. That is, I enrich the topics. In this process, the crowded classes may lead to problems."

"... we make experiments, drama, games, but when the classes are crowded it becomes more difficult."

Question 8. In Discovery of Individual Talents activities, "project preparation, forming interdisciplinary relationships, and development of creative activities" are required. To this end, what kind of activities do you carry out? What are the problems you encounter in this process?

Table 9. Activities in the Discovery of Individual Talents

Activities Done	f
Project	4

Table 10. Problems encountered in the process of Discovering Individual Talents

Problems Encountered	f
Limited weekly course hours	2
Shortcomings in the completed projects	1
Financial problems	1
Lack of materials	1
Unwillingness of students	1

All of the teachers reported doing projects in this process. The problems encountered were listed as follows: limited weekly course hours (2), shortcomings in the completed projects (1), financial problems (1), lack of materials (1) and unwillingness of the students. Below some of the teacher opinions are listed: "...I do project work in this process. I provide theoretical and technical support related to the project. However, in this process we can experience many problems when the students finish the project."

problem is lack of class hours. The science students have to take Turkish, Literature, English and Computer, only 1-2 hours can be allotted to physics".

"First, I make them write about their dreams and help them to turn the applicable ones into projects. In this process, we experience problems in especially time, materials and finance."

"The topics determined by the students are developed and turned into projects. In this process, students may be unwilling at times."

"... we do project work. Active participation of the students is very important. The greatest

Question 9. At the stage of Developing Special Talents, "making projects specific to the individual and making the individual aware of his/her interests and talents" is aimed at. To this end, what kind of activities do you carry out? What are the difficulties that you encounter in this process?

None of the teachers reported moving on to the "development of special talents" stage. For this reason, they could not answer these questions.

Question 10. At the stage of Project Production and Preparation, "an original project should be prepared and presented". To this end, what kind of activities do you carry out? Please give information on the problems you encountered in the project development process. None of the teachers reported moving on to the

"project production and preparation" phase. For this reason, they could not answer these questions.

Question 11. How should the program to be applied in Science and Art Centers be characterized? Please express your opinions.

All of the participating teachers reported that there should be a curriculum. However, they stated that this curriculum should be highly flexible as opposed to that of formal education. Below some of the teachers' opinions are provided: "Here, a strict curriculum cannot work. It cannot be implemented in any way. However, a framework curriculum might be very good. We can make enrichments or reductions as necessary. If I carry out the activities that students want, their interest in the lesson will increase. If it is strict, I have to tell the students that I cannot realize their wants. This will not work. For this reason, the curriculum should be flexible, which will help students view the courses positively. If they think that the teacher is considering their needs, their interest in the course will increase."

"... a modular draft, rather than a strict curriculum, which will outline the general framework can be prepared. We should be free in the preparation of activities. For, most of the time we reshape the activities in line with the questions. Thus, the student feels that s/he is valued."

"...a curriculum is necessary, but it should be flexible."

Conclusion and Discussion

All of the participating teachers stated that they carried out student-centered activities in the Science and Art centers. However, they mentioned problems in the acquisition of basic concepts and psychomotor skills and lack of a certain framework program within their activities towards identifying cognitive, affective and psychomotor development. Two teachers reported that they did not encounter any problems in this process. All of the participants reported that they ran parallel to the formal education institutions.

The problems encountered in this process were listed as moving on to higher level topics during the enrichment of the topics, inability to find different and original activities and lack of branch teachers. One of the teachers stated that s/he did not experience any problems in this process. As regards the communication in the Student-Parent-Center (SAC) circle, teachers mentioned student absenteeism, students' private course problems and the parents who have not grasped the importance of SAC as problems in this process. In addition, all of the participating teachers reported that they had access to the necessary measurement devices and none encountered any problems within this process. None of the participants reported any problems related to the adaptation period. They stated that in this process, the introduction of the unit and the identification of students' interests and talents are performed. They mentioned doing drama, poster preparation, project work, games, model preparation and experiments during the Support Education process. The crowded classes were reported to pose problems in this process. Two teachers reported that they did not encounter any problems. In the process of Discovery of Individual Talents, all of the teachers stated they did projects. The problems encountered were listed as limited weekly course hours, shortcomings in the completed projects, financial problems, lack of materials and unwillingness of the students. This result is in line with Gökdere, Küçük and Çepni's (2004) results. The researchers had expressed students'

inadequacy in the use of technology. Considering this result, it could be argued that the technical facilities in science and art centers should be improved.

All of the teachers stated that the stages of "development of special talents" and "project production and preparation" were not realized. For this reason, they could not answer these questions.

All of the participating teachers reported that there should be a curriculum. However, they stated that this curriculum should be highly flexible as opposed to that of formal education. Boran and Aslaner (2008) point to development of new activities for improving the curricula in the science and art centers. The necessity for a more flexible curriculum is obvious from this result.

The following recommendations can be given on the basis of the research findings.

- Needs analysis should be conducted for teachers serving in the science and art centers and informative seminars should be organized specific to each branch.
- A framework program should be developed for science and art centers and expert support should be utilized.
- The teachers to work in science and art centers should be selected carefully.

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