



## The Primary School Science Teachers' Problems in Science Teaching

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### ABSTRACT

This study aimed to determine that the problems of the primary school science teachers encountered during science teaching. Therefore, the problems of the primary school science teachers encountered were examined under these issues: graduation from several departments of universities, curriculum, educational materials, laboratory, assessment and evaluation. This research was conducted with 10 primary school science teachers in Balıkesir in the semester of 2004-2005. The data were collected by a semi-structured interview protocol and qualitative method was used to analyze data in the study. The results of the study revealed that graduation from several departments of universities affected teaching of science negatively. In addition, teachers had some problems in completing science curriculum in time, doing laboratory studies, and making assessment and evaluation.

**Keywords:** Curriculum; Primary School Science; Science Teaching.

### INTRODUCTION

Some of the most distinct characteristics of science are experiment, observation, and discovery. Science provides the development of skills of students' asking questions and making investigations; making hypothesis, inference of results of experiments to students (Açıkgöz, Kaygusuz, & Öncül, 2004). Laboratory method is often used in science and it is targeted that students do trial and error activities. Therefore, the laboratory applications are integral part of science (Orbay, Özdoğan, Öner, Kara, & Gümüş, 2003). However, there are some breakdowns present applications of science.

Because of shortage time of science courses in previous curriculum is difficult to improve the quality of science education developed countries review consistently science curriculum making need analyses and they make some studies related to the reviewed curriculum to be applied effectively at schools. In order to determine and evaluate how extents attaining the objectives of Science education made contribute rising efficiency of education (Cerrah, & Ayas, 2003). The Turkish curriculum has been developed considering present problems and it brought up the matter of educating qualified science teachers for new curriculum (YÖK Raporu, 1998; Morgil, & Yılmaz, 1999). There are

several studies of Higher Education Council and the Ministry of Education on the matter of educating qualified science teachers. To this end, it has been begun the re-construction of Schools of Education in the scope of the Development Project of the Ministry of Education and it has been updated according to today's requirements. Consequently, secondary science teachers have been educated according to expectation of the Ministry of Education. However, there was a lack of qualified science teachers. Therefore, people graduated from several departments such as biology, physics, and chemistry was attained as a science teacher. However, they were not willing to work as a science teacher in primary schools. Therefore, all schools of education were reconstructed by the collaborations of Higher Education Council, the Ministry of Education, and the representatives of faculties of education (Yazıcı, 1994).

The goal of the study was to determine problems of primary school science teachers graduated from several departments of universities.

## METHODOLOGY

### a) Sample Group of the Study

This study was done with 10 primary school science teachers from Balıkesir in the spring term of 2004-2005 concerning this statement of Patton "there is no rules for sample size in qualitative inquiry" (Patton, 1990, p.184). Convenience sampling was used in this study and all participants were willing to participate to the study. All participants graduated from the departments of biology, physics and chemistry education, and biochemistry from several universities.

### b) Data Collection and Data Analysis

Data were collected by using "qualitative method" (Yin, 1984; Yıldırım, & Şimşek, 2005). The primary school science teachers were interviewed about the problems encountered during the science courses by a semi-structured interview protocol. There were 10 open-ended interview questions and in order to ensure the validity of the questions, three experts were examined them. After the revision of the questions, eight experts were also checked the items. In addition, reliability of the study was considered. Each interview took approximately between one and two.

Data were analyzed by using "descriptive analysis technique". Data were summarized according to defined themes beforehand. Common views were classified in under defined themes and some of the views were given directly as in quotations (Yıldırım, & Şimşek, 2005).

## FINDINGS

In this study, science teachers' views were examined under some categories defined beforehand. The aim of the study was to determine the problems of primary school science teachers encountered during the science courses. The findings of the study were given below. Table 1 presents personal characteristic of study group.

According to Table 1, while teachers' teaching experience changed between 2 and 10 years, teaching experiences as science teachers changed between 3 months and 7 years. They graduated from the departments of biology, physics and chemistry education, or biochemistry. For example, one of the teachers included in the study was graduated from the department of chemistry education from Faculty of Necatibey Education, Balıkesir University. While he has four-year teaching experiences, he has worked three years as a science teacher.

**Table 1.** Personal Characteristics of the Study Group

University and Faculty	Department	Teaching Experience	Teaching Experience as a Science Teacher	Previous Job
Faculty of Necatibey Edu. (Balıkesir University)	Biology Edu.	6 years and 7 month	6 years and 7 months	Science Teacher
	Biology Edu.	7 years	7 years	Science Teacher
	Biology Edu.	7 years	2 years and 3 months	Biology Teacher
	Biology Edu.	2 years	3 months	Biology Teacher
Faculty of Necatibey Edu. (Balıkesir University)	Physics Edu.	4 years and 10 months	4 years and 10 months	Science Teacher
	Physics Edu.	4 years	4 years	Science Teacher
	Physics Edu.	4 years	2 years	Physics Teacher
	Chemistry Edu.	4 years	3 years	Chemistry Teacher
Faculty of Samsun Edu. (19 Mayıs University)	Chemistry Edu.	7 years	2 years	Chemistry Teacher
Faculty of Science and Literature (Ege University)	Biochemistry	10 years	5 years	Chemistry Teacher

Edu. : Education

### a) Effects of Graduation from Several Departments

In Table 1, teachers in this study graduated from several departments stated that they were not satisfied and happy with their job. They mentioned that they felt insufficient about other subjects except their own subject matter; they could not make connection between cause and effect of science concepts and topics; they asserted that courses taken in the universities did not affect their science teaching. For example, six teachers said that they did not feel confident about other subjects except their own subject matter as follow:

*“I don't like in employing as a science teacher as my major was physics education. I graduated as a physics teacher and I want to work in my major”.*

*“I don't like in employing as a science teacher as my major as a chemistry education. As I believed that I had not enough knowledge in physics and chemistry, I was successful teaching chemistry topics, but I was not successful teaching other science topics enough. I took physics course in undergraduate level and biology course in high school and I did not like them. I suppose that the most difficult major was science teaching because you needed to know to teach physics as a physician and needed to know to teach biology as a biologist... “*

As a result, some teachers said that they graduated from the department of physics education, so they had difficulties in teaching chemistry and biology topics. One of the crucial points of the study is they mentioned that they dislike science teaching. It is impossible to be successful in a job if you do not like what you are doing. Three of the science teachers did dislike being a science teacher.

### **b) Effects of Curriculum to Science Teaching**

10 science teachers in the study stated that curriculum could not be implemented in science courses. Some ideas related to them:

*“Daily lesson plans should be in detailed for implementing curriculum. It caused time consuming and to give unnecessary information. Curriculum is needed to revise. The sequence of the topic lists should be changed and unnecessary information should be removed”.*

*“Curriculum was very intensive and required be completed observation forms, to be done experiments, and to be made collaborative learning. But, the science course hours were not enough and also classes were crowded”.*

Science teachers reported that they had difficulties in implementing science curriculum.

### **c) Effects of Course Materials**

Seven science teachers stated that they had difficulties in providing course materials for effective science teaching. They used different course materials in addition to science textbook. Posters, graphs, overhead projectors, and VCD were needed for effective science teaching.

*“When visual materials were used in science teaching, effective learning was done. However, we could not provide visual materials and I did not think that better learning and understanding could not be done”.*

*“As I graduated from the department of biology education, I did not take physics courses in detailed. Therefore, I had difficulties in providing materials for teaching physics and I could not prepare required environment for teaching physics topics”.*

As a result, science teachers emphasized that teaching science would very efficient if it was taught visually and they thought that the materials did not meet their needs with regard to classroom and laboratories teaching in science education best fit to new Turkish National Curriculum.

### **d) Effects of Laboratory Environment**

All science teachers highlighted that science courses should be taught in laboratories for helping students have better understanding of science concepts.

*“I taught all science courses in laboratory. Thus, both students got used to environment and also effective teaching was occurred. Students started to begin wonder everything and asking questions”.*

On the other hand, seven science teachers stressed that laboratories were not well organized for teaching science and they did experiments in the classroom. It caused teaching science ineffectively. Two teachers' views about efficient science teaching were:

*“As our science laboratory was very small, I did most of the experiments in classroom. I had to carry out all equipments to classroom. In addition, since I did not have course of using laboratory I had difficulties in set up experimental design. I tried to do it using my university background knowledge, but it was time consuming”.*

*“I had difficulties in preparing hand-out materials and other materials. As classrooms were so crowded, I did all demonstrations myself”.*

To sum up, science teachers underlined that all experiments should be done in laboratories and if they are done in the classroom they cause many problems. Furthermore, they had had problems in planning handout materials and supplying materials.

### e) Effects of Assessment and Evaluation

All of the science teachers mentioned that they used similar assessment and evaluation techniques for their courses. Two science teachers' opinions were given below:

*“I used tests and oral exams for the evaluation of science courses. I asked open-ended items and multiple-choice items. However, in my opinion these methods could not assess students' performances. Students memorized some knowledge and better learning could not be achieved”.*

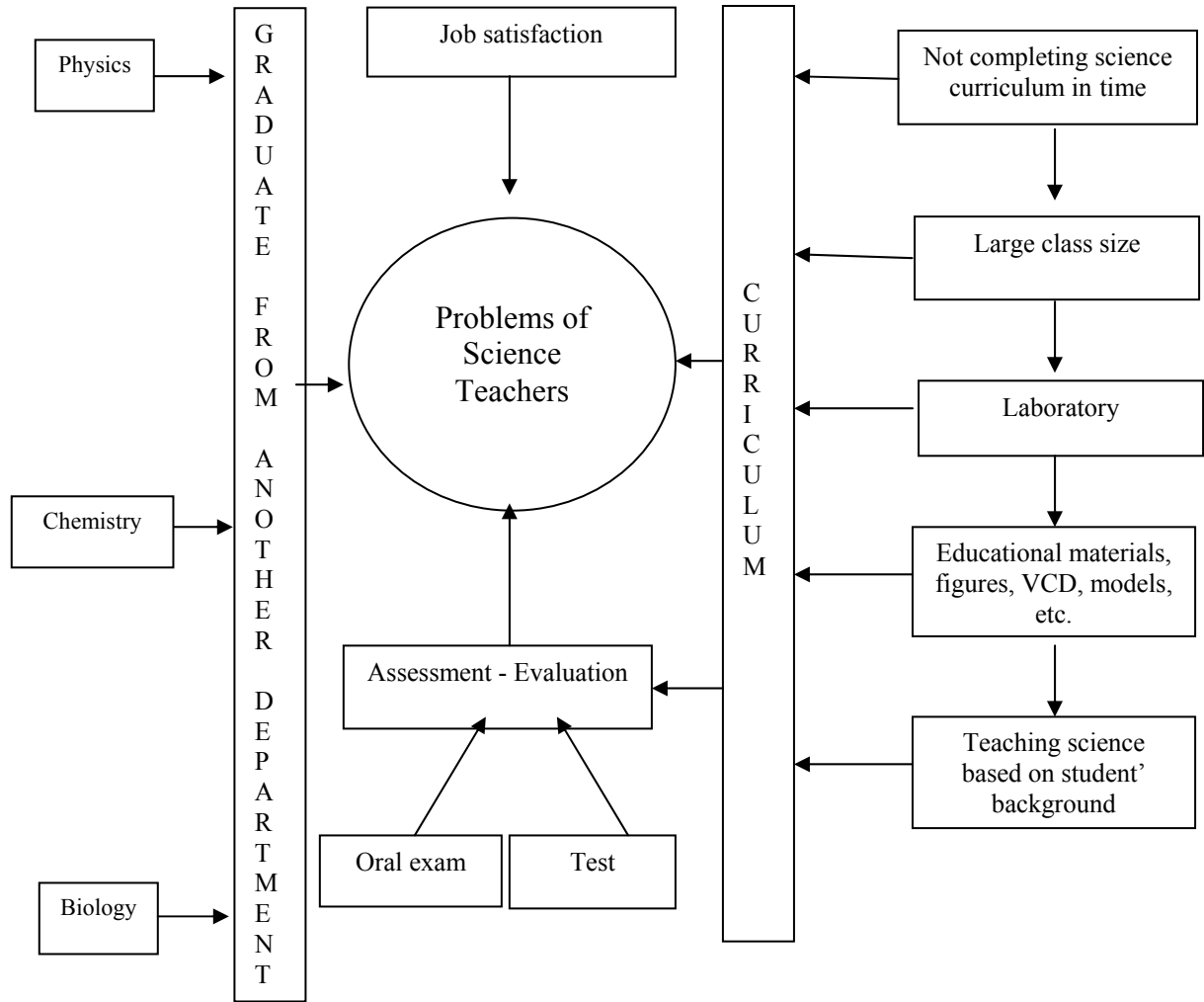
*“If the topics were related to my major, I asked some questions such as ‘why, where, what was function’ during the science course”.*

## RESULTS

This study was done with 10 primary school science teachers in Balıkesir. As it was a small-scale study, it was difficult to generalize in the results we obtained. However, science teachers who graduated from several departments can be faced with similar problems (Figure 1).

According to the results of the study, science teachers were not happy to work as a science teacher in their schools. On the other hand, since it was difficult to find a new job, they wanted to their current occupations in general. Actually, they wished as if they worked as biology, physics, or chemistry teachers in a secondary school, not in primary schools. The results showed that they have not had enough professional knowledge and pedagogical content knowledge about primary school science, except their own majors. Therefore, these teachers could not teach effectively primary school science in their classes. Teachers have also emphasized that they were behind the primary school science curriculum because of the comprehensive primary school science curriculum. Primary school science teachers reported that class size was over-crowded. As laboratories did not have enough equipment, teachers did some demonstrations in the classrooms.

Davis (2002) emphasized that content knowledge and subjects were crucial in science teaching. Additionally, as time for science curriculum was not enough, all topics in the curriculum could be completed in time. This finding overlapped some results of the studies of Çepni, Küçük, and Ayvaci (2003). They reported that course materials in school were not enough and it was difficult to get those materials. Although laboratories were very important for teaching science, they were not used often for teaching science. Teachers did some demonstrations in the classrooms. The results of Özmen and Ayaz (2001)'s study were agreed with our findings. They highlighted that there were lack of materials, physical layout, and chemical substances. Additionally, our current study revealed that science teachers used tests and oral exams for the evaluation of science courses, students memorized knowledge, and their level was low. These findings overlapped to the study of Bakaç (2003).



**Figure 1.** Some Problems Encountered by Primary Science Teachers in Science Courses

## SUGGESTIONS

Based on the results of the study, we suggested:

- The science course should be taught by science teachers rather than teachers graduated from several departments.
- There were science teachers graduated from several departments and they needed to take in-service training courses.
- Science teachers graduated from several departments should be attained to their own majors.
- Laboratories should be set up or re-organized for effective science teaching in primary schools.
- Qualities of science teachers should be examined regularly and curriculum should be organized for improving their qualities.
- Moreover, science teachers should follow new technological developments in science and they should apply them to their subjects.
- Science teachers should use alternative assessment methods such as portfolio and project work in science teaching.

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