International Journal of Psychology and Educational Studies, 2020, 7 (3), 111-125

PES

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International Journal of Psychology and Educational Studies

Science Teachers' Opinions about 5th grade students and their science teaching experiences after 4+4+4 System

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ARTICLE INFO

Article History:
Received 08.03.2020
Received in revised form 19.06.2020
Accepted 29.06.2020
Available online 12.09.2020

ABSTRACT

With the introduction of the 4+4+4 education system in 2012, the school starting age has been reduced to 60 months and branch teachers started to attend classes starting from 5th grade. Therefore, in the current study, there are two aims. Firstly it is aimed to determine the opinions and experiences of science teachers having started to teach the 5th graders for the first time in the new education system. Secondly, it is aimed to determine the opinions and experiences of science teachers having started to teach the 5th grader students (including 9 years old) who started school in the 2012-2013 academic year and ranked 5th in 2016-2017. The current research study is a phenomenological study conducted on 22 teachers who taught to 5th graders in the 2016-2017 academic year and also had taught to 5th graders in the previous academic year. The data of the study were collected through semi-structured interviews. As a result of the study, it was determined that science teachers confront a number of difficulties in terms of teaching to 5th graders, and these difficulties increase with the number of students who started to school at an early age in a classroom. The teachers noted that students who start school at an early age are not ready to school both from affective and cognitive aspects. They also stated that they are required to deliver courses by making more activities and concretizing the subjects. As the teachers participating in the study also highlighted, regulating the school starting age to 72 months is important and necessary for both primary and middle school levels.

Keywords:
4+4+4 education system, science teachers, school starting age, teachers' opinions, teachers' experience

1. Introduction

School starting age varies from country to country. While discussions on the ideal school starting age still continue (Buldu and Er, 2016; Sharp, 1998; Sharp, 2002), the generally agreed school starting age in the world seems to be 6 years old (72 months) (Arı, 2014; Keith, 2013). When the countries in the world are examined in this regard, it is seen that children start school at the age of 4 in one country, at the age of 5 in 19 countries, at the age of 6 in 119 countries, at the age of 7 in 47 countries and at the age of 8 in one country (Kapçı, Artar, Avar, Daşçı and Çelik, 2013). On the other hand, in recent years, though the school starting age is reduced to earlier ages in European countries up to 4 years old (Eu, 2016), this is protested in England with the slogan "Too Much, Too Early" (URL 1). While in some countries the pre-school education is included within the compulsory education, leading to smaller school starting age, in some others, compulsory education starts with the primary education.

While debates for and against the reduction of the school starting age still continue in the world (Kail, 2017), in Turkey with the amendment made in the education system in 2012, the eight-year compulsory education

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• This artcile was presented at 26th Internetional Conference on Educational Sciences.
http://dx.doi.org/10.17220/ijpes.2020.03.011

was increased to 12-year compulsory education with the introduction of the 4+4+4 education system. This sudden change has also brought about discussions. Academicians, civil society organizations etc. criticized the change and serious criticisms were levelled against the school starting age (Boğaziçi University Faculty of Education, Faculty Committee Decision 2012; Education Reform Initiative, 2012; Hacettepe University, 2012; ODTÜ Faculty of Education Faculty Committee, 2012; Turkish Medical Association, 2012).

The sudden change in the school starting age caused many children to start primary school unpreparedly. In the first year of the implementation, children were registered to the first grade starting from 60 months old. The physical conditions of schools were not ready for 5-year-old children, and also teachers did not have the experience of working with such young children. Despite the fact that the first week was determined as the orientation week, it did not make the expected impact due to the unreadiness of both children and teachers (Buldu & Er, 2016; Eğitim Bir Sen, 2012; Sahin & Guzel, 2018; Şentürk, 2016).

Many research studies revealed that children who start school at an early age have orientation problems, and are not physically, affectively and cognitively ready for such kind of an implementation (Cerit, Akgün, Yıldız & Soysal, 2014; Doğan, Demir & Pınar, 2014; Epçaçan, 2014; Kahramanoğlu, Tiryaki & Canpolat, 2014; Şentürk, 2016; Uzun & Alat, 2014). The review of the research studies conducted on the issue demonstrates that the problem has been addressed only from the 1st grade perspective, and there is no broader perspective which addresses the long terms impacts of early schooling. However, early schooling is not only a first-year problem as education life is a long process. The impacts of early schooling should be discussed not only in terms of short-term impacts, but also in terms of the long-term impacts (Bedard & Duhey, 2006), and the situation should be addressed from the perspective of skills that are required for learning. Particularly, the courses that a student will be taught in upper grades and the skills which are necessary for meaningful learning should be taken into consideration.

In the first years of the school, courses such as reading-writing, basic mathematics and social studies are taught to students and starting from the 3rd grade students are taught the science course. Students' cognitive development levels appear as an important factor in terms of the science course, particularly starting from the 5th grade. The underlying reason for this situation is the content of the science course which includes phenomena that cannot be observed directly in daily life. Furthermore, many concepts provided in this course are interrelated, and the relation between the concepts should be understood by students. The comprehension of this relation requires high-level skills such as identifying the relations between problematic variables, rationalizing through deduction and induction, integrative thinking, problem-solving by including multiple problems, and analytic thinking (Bacanlı, 2005; Senemoğlu, 2011). Most of these skills are included in the 'formal operational stage' period. The formal operational stage period starts from the age 11 (Charles, 1999) according to Piaget's classification. Piaget provided the features of the operational stage period under six headings as; hypothetical thinking, combined thinking, probabilistic thinking, identifying and controlling variables, correlational thinking, and rational thinking (Çepni, 2011; Piaget, 2007). Despite the recent research studies which argue that students can acquire these skills earlier (Cited from Houde, 2004 by Gunes, 2013), Piaget's classification provides an insight about the average cognitive development of children. The impact of early schooling on the following years should be taken into account.

Students who started primary school in the 2012-2013 academic year as 60-66 months old (5-5.5 years old) started 5th grade in the 2016-2017 academic year as 108 months old (9 years old). With the 4+4+4 system, 5th graders become middle school students. The progression from primary school to middle school brings about many differences for students. In middle school, students start to receive courses from branch teachers. Furthermore, contents of courses intensify, and accordingly, students need more cognitive skills. Science course is one of the courses requiring these skills from students. However, the readiness of students who started primary school at the age of 60 months with the 4+4+4 system to the science course appears as an important problem. In this context, the present study aimed to investigate experiences of teachers on the status of students, who started primary school in 2012 and became 5thgrade in 2017, in terms of the science course from both teachers' and students' perspective. Previous studies in the literature have almost exclusively focused on 1st grade teachers (Aykac, Kabaran, Atar & Bilgin, 2014; Kutluca Canbulat & Yildizbas, 2014; Ozden, Kilic & Aksu, 2014; Ozenc & Cekirdekci, 2013). It is seen that there is a limited number of studies on branch teachers (Aytaçlı & Gündoğdu, 2018; Karadeniz &Ulusoy, 2015; Demir, Dogan & Pinar, 2013; Zayimoglu Ozturk, 2015) and they mainly focus on the elicitation of opinions (Ciray, Kucukyilmaz & Guven, 2015;

Memisoglu & Ismetoglu, 2013; Uzun & Alat, 2014; Unisen & Kaya, 2015). However, students who start school at an early age should be evaluated not only in relation to classroom teachers but also branch teachers in middle school. Therefore, in this study, it was aimed to investigate the experiences and opinions of science teachers after the 4 + 4 + 4 education system change. Determination of the experiences and opinions of science teachers about teaching 5th graders for the first time and children starting school at an early age is believed to be important.

Purpose of the study

The purpose of the current study is to determine the opinions and experiences of science teachers' about students and courses after the 4+4+4 education system. With the 4 + 4 + 4 education system that started to be implemented in 2012-2013, science teachers faced two different situations. Firstly, before the 2012-2013 academic year, science teachers were teaching from the 6th grade. With the 4 + 4 + 4 education system, teachers started to take science lessons from 5th grade. The following sub-problems were created regarding the opinions and experiences of teachers about this new situation:

1. After 4+4+4 education system, what are the opinions and experiences of the science teachers' who started to teach science course to 5th graders (students started school after 72 month old) for the first time, on the students in this age group and courses?

2. After 4+4+4 education system, what are science teachers' comparisons with respect to teaching 5th graders and teaching to upper grades?

Secondly, with the 4 + 4 + 4 education system, students started school from 60 months in the 2012-2013 academic year, and in the 2016-2017 academic year, these students became 5th grade. Therefore, teachers have come across classes with students with younger age group. Related to this, the following sub-problems were asked:

3. What are the opinions and experiences of the science teachers having started to teach science to 5th graders who started primary school after the 4+4+4 education system in 2012-2013 and became 5th graders in the 2016-2017 academic year?
4. After 4+4+4 education system, what are the opinions and experiences of teachers about teaching science to 5th graders in 2016-2017 education year with students who started school at an early age (after 60 month old) and to 5th graders in previous years (2012-2013, 2013-2014, 2015-2016, 2016-2017 education years)?

2. Method

The phenomenological approach was employed in the current study in the framework of the qualitative research design. Phenomenological approach is a process which is used to reveal a complex problem that does not come to light straightforwardly, in other words, it is a process which is used to reveal the 'truth'. Investigation of the individual universes forms the object of phenomenology, and individual experiences are at the center of the process. A researcher is interested in the subjective experiences of participants and analyzes the perceptions of individuals on the issue, and the meanings they attribute to events (Baş & Akturan, 2008). In this way, it is possible to acquire profound information on phenomena that we are not well-informed about (Creswell, 2013; Holstein, Gubrium, 1996; Yıldırım & Şimşek, 2006). In this study, the phenomenological approach was preferred to reveal the opinions of science teachers', who have experienced teaching 5th grade students (starting by 72 months old) for the first time after the implementation of the 4+4+4 system, on their teaching experiences and on the status of students who started to school younger than 72 months old in terms of the science course.

2.1. Participants

The sample of the study was specified through the criterion sampling method which is a purposeful sampling technique. In criterion sampling, units that fulfill the requirements specified for the study group (objects, events etc.) are included in the sample (Büyüköztürk et al., 2012). In this context, it was determined as a criterian that science teachers had taught science to 5th grades students in 2015-2016 and 2016-2017 academic years to select the participants of the study. For the selection of teachers, an announcement was published on

the social media, and interviews were conducted with teachers who volunteered and met the criteria. Thus, a total of 22 teachers participated in the study. The characteristics of teachers are presented in Table 1.

Table 1. Demographics of Teachers who Participated in the Study

Demographics of the Study Group		Frequency
Gender	Female	16
	Male	6
Age	21-30	9
	31-40	12
	41-50	1
Professional Experience	0-5 years	7
	6-10 years	9
	11-15 years	5
	16 years and more	1
Cities where teachers working	Sakarya	13
	İstanbul	4
	Mersin	4
	Van	1
Educational Status	Bachelor's degree	17
	Master's Degree	-
	Master's Degree cont.	4
	PhD	-
	PhD cont.	1

2.2. Data Collection Tools

Study data were collected via semi-structured interviews. In the semi-structured interviews, primarily the objectives and goals of the study were determined to decide which questions to ask. The questions were shaped on the basis of two main problems. The first one included the opinions and experiences of science teachers' who had started science teaching to 5th grade students in 4+4+4 education system. The second one included the experiences about teaching science to students who had started school as from the 60th months old in the school year of 2012-2013 and were 5th grade in the school year of 2016-2017. The interview questions were prepared on the basis of these two main questions. Two science teachers were interviewed in term of the comprehensibility and utility of the questions and the questions were arranged in a simple and comprehensible way according to the feedback. During the semi-structured interviews, firstly demographic characteristics (year of seniority, school) were elicited and then the following questions were asked:

1. Science teachers have been teaching to 5th grade students since the year 2012-2013 education year. How can you describe your experience? Can you share your opinions and experience with us?

2. In comparison to your teaching experience with upper grades (6th, 7th and 8th grades) and 5th grade, what kind of differences have you observed? What are your experiences?

3. As a result of the 4+4+4 system, this year you are teaching to younger children. Do you see a difference between these students and 5th grade students that you taught in previous years? If yes, can you describe these differences?

4. Do you need special activities while teaching? Can you provide an example?

2.3. Data Analysis

The data collected through the semi-structured interviews were analysed with the content analysis method. For the contents analysis, first of all, the transcription of the recorded interviews was made. Afterwards,

transcriptions were read without marking. In the second reading, important expressions were underlined. The underlined expressions were examined and codes were created. In the final reading, the frequency of the codes was determined. These processes were carried out by two researchers independently. Later on, the researchers compared the codes, and identified the expressions that they agreed and disagreed. The codes that they reached a consensus on were included exactly, and the codes that the researchers had disagreement on were reviewed and discussed, and a consensus was sought. The codes which were reviewed for the last time were then put into the final form.

In order to increase the reliability of the study, a sample expression was provided for each code. While providing these expressions, codes were used instead of the real names of the individuals. These codes were created with the information based on the gender and information provided during the interviews. For instance, the male teacher who was interviewed in the second place was described as M2. Sample expressions were written in italics and provided in inverted commas.

3. Findings

The findings obtained as a result of the semi-structured interviews are presented under two main headings.

1. Opinions and experiences of science teachers' having started to teach 5th graders in the implementation of the 4+4+4 education system in the 2012-2013 academic year.
2. Science teachers' opinions and experiences about teaching science to students who started to primary education (by 60 months old) in the 2012-2013 academic year and became 5th graders in the 2016-2017 academic year.

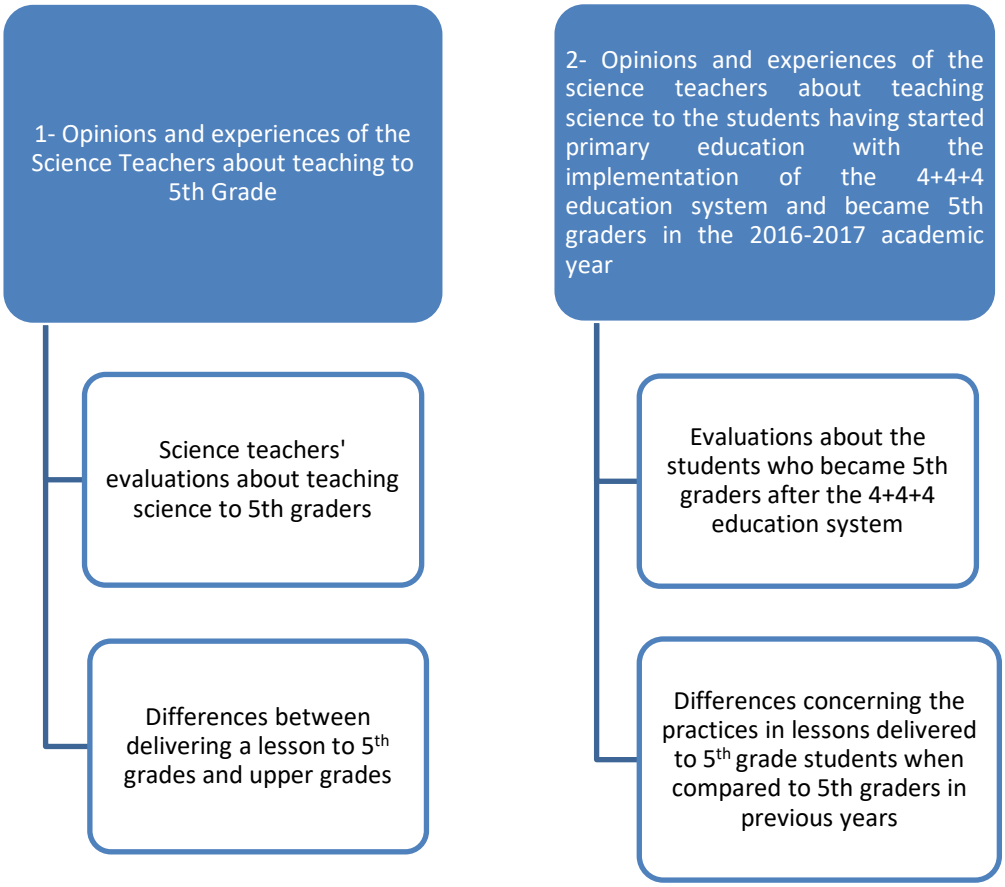

Figure 1. *Design of findings*

3.1. Science Teachers' Evaluations about Teaching Science to 5th Grade Students

In findings retaled to science teachers' opinions about teaching science lessons to 5th grade students showed that out of 22 teachers, 16 of them positive, 6 of them negative opinions expressed.

The teacher coded F12 who found teaching to 5th grade students positive stated that "*The good part of this situation is that we start to educate students well-equipped before a child starts to 6th grade. We can differentiate between students who are educated by primary school teachers who put attention on the science course, they are well-equipped. However, a teacher who does not put enough attention to the science course also teaches superficially.*" In a similar way, the teacher coded F15 stated that *"…From which perspectives is it defined as good? I think that we are able to eliminate many misconceptions. For example, primary school teachers did not put an emphasis on the heat-temperature unit, and frankly, there were many misconceptions in upper -grades."* As it is understood from these statements; that findings showed that teachers find the delivery of lessons by branch teachers positive.

However, besides these positive opinions teachers mentioned negative situations as well. They expressed the negative aspects in term of the teacher and student perspective. The related codes are provided in Table 2.

Table 2. Findings on negative aspects of delivering lessons to 5th grade students by science teachers

Themes	Codes	Frequency
Negative aspects from teachers' perspective	Continuation of primary school behaviors	15
	Incapacity to lower themselves to students' level	8
	Childish behavior of students	4
	Lack of experience in this age group	4
Negative aspects about students	Cognitively unreadiness	10
	Affectively unreadiness	3
	Physically unreadiness	3

As presented in Table 2, the negative opinions of teachers on teaching 5th grade students by branch teachers were grouped under two themes. Teachers described the continuation of primary school behaviors, childish behavior of students, incapacity to lower themselves to students' level and their lack of experience in this age group as negative aspects from teachers' perspective; and cognitive, affective and physical unreadiness was regarded as the negative aspect from students' perspective. The sample teacher expressions are presented below:

The teachers often expressed negativities concerning teaching to 5th graders such as students' continuation of their primary school habits and cognitive unreadiness the teacher coded F14 expressed her experiences on the continuation of primary school behaviors, childish behavior of students as; *"It was difficult for me. Because 5th grade students seemed childish to me as we teach to 6th, 7th and 8th grade students. I could not get used to the situation. Students could not get used to us as well. They consider us as a primary school teacher. For example, they were all standing when we entered the classroom, they needed to come close to us, touch us or give us hugs, and they were complaining constantly. They were also touching to our belongings, as they had such kind of close relationships with their primary school teachers they also expected the same from us. It took a lot of time to teach them the rules and that they are middle school students now. Believe me, the first one or two months were about teaching behaviors. However, in terms of the courses, they told us that they enjoy classes more…"*

The teacher coded F12 stated her opinions on the continuation of primary school behaviors, childish behavior of students, incapacity to lower themselves to students' level and lack of experience in this age group as; *"… I mean it in terms of the age group, not by including this year, even they seem childish to us. We did not receive any education on lowering ourselves to students' level, but the only problem is the age. The negative aspects are their childish behavior, they want to treat us as they did to their primary school teachers."*

The teacher coded F5 expressed her opinions on cognitive and affective unreadiness and incapacity to lower themselves to students' level as; *"They might be at an appropriate level by age in our field, however, they are not emotionally competent as well. In this sense, as teachers, we face serious difficulties with children. We face problems in*

terms of communicating with them. There is a problem in this sense. And also, they have more concrete expectations. We expect them to think more concretely, yet something happens at that point, and we have difficulties in terms of lowering ourselves to students' level. In terms of thinking, we face difficulties in terms of their comprehension of the content. As I say, they are not competent emotionally, and also in terms of their cognitive development levels."

3.2. Opinions and experiences of the teachers about the differences between teaching to 5th grade students and teaching to students from upper grades

The answers provided by teachers to the question about the differences between lessons delivered to 5th grade students and students from upper grades are presented in Table 3.

Table 3. Findings on the differences between lessons delivered to 5th grade students and students from upper grades

Differences between lessons delivered to 5th grade students and students from upper grades	Frequency
Designing activity-based lessons	10
Easiness of the curriculum	10
Students' eagerness to participate in lessons.	6
Need for visual support	5
Cognitive Readiness	5
Absence of exam anxiety	3
Changing the communication style	2
Repeating	2

In terms of the differences between teaching to 5th grade students and students from upper grades, the teachers stated that they can design activity-based lessons most frequently in 5th grade classrooms, as it can be seen in Table 3. Moreover, they indicated that they need to teach courses with visual support as students are not cognitively ready to understand certain subjects. In addition to the given differences, teachers considered the easiness of the 5th grade curriculum and the absence of TEOG exam (Transition from Primary to Secondary Education Exam) anxiety as positive aspects. Teachers noted that they are content with students' eagerness to participate in lessons.

The teacher coded F9 expressed her views on delivering activity-based lessons as; "*I mean, the subjects of 6th, 7th and 8th grades are more difficult. They are easier in the 5th grade as we consider this period as a transition period. It is more convenient for us. The curriculums of 6th, 7th and 8th grades are more intensive. That's why we don't have the problem of covering the subjects on time. The time of the course is enough … students do lot of experiments…"*

The teacher coded M2 stated his opinions on students' eagerness to participate in lessons as; *"The subjects of the 5th grade curriculum is more based on experiments, more from daily life, so they draw more attention and students are eager to learn. However, in upper grades this eagerness and excitement diminish."*

The teacher coded F14 indicated her opinions on students' eagerness to participate in lessons and revising as; *"5th graders need to participate in lessons more in comparison to 8th graders and eager to be active. 8th grade students can alienate themselves from the lecture as they are teenagers, they get bored and think like "we are doing the same thing or how many times we need to do this etc. However, 5th grade students want to do the same experiments for 5-6 times without getting bored. They all want to participate in the lesson."*

The teacher coded F13 specified her opinions on students' cognitive readiness as *"… and their cognitive readiness is certainly notable. They are definitely not ready for the subjects."*

The teacher coded F8 expresses her views on changing the communication style as; *"They are more childish, and you approach them nicely, by considering that they are children, or in exams the roots of the questions need to be clearer and supported by images, but upper-grade students can understand better in comparison to them."*

As is seen in the sample statements above, teachers need to concretize and frequently repeat the subjects while delivering lessons to 5th graders. It is possible to associate this condition with cognitive inadequacy of students, which is also mentioned in the teachers' statements. The students who were in the primary school period and continued their primary school habits became a new, different and compelling experience for the teachers who were not acquainted with that age group. On the other hand, the fact that the aforementioned age group challenging the teachers was eager to attend the class and wanted to perform experiments over and over made the lessons more entertaining and fun. Besides, the teachers evaluated the lightened 5th grade curriculum as a positive feature

3.3. Opinions and experiences of the science teachers about the students who had started school younger than 72 months and were 5th grade in the school year of 2016-2017

The findings concerning the differences of students who started primary school when they were at least 60 months old with the implementation of 4+4+4 system and started 5th grade in the 2016-2017 academic year are presented in Table 4.

Table 4. Differences from 5th grade students in the 2016-2017 academic year

Differences from 5th grade students in the 2016-2017 academic year	Frequency
Cognitive readiness	12
Physical readiness	9
Behavioral problem	6
Desire to play games	6
Discipline problem	3
Short attention span	2
Seeking special attention	2
Falling short of the activity goals	2
Other	2

As is seen in Table 4; the teachers frequently stated that they found the 5th grade students to whom they had taught in the school year of 2016-2017 to be different from the students in the previous years in terms of cognitive (12) and physical (9) readiness. That was followed by displaying childish behaviors (6), desire to play (6) and discipline problem (3).

The teacher coded F11 indicated her opinions on students' display of childish behavior/ behavioral problem, desire to play games, seeking special attention, and falling short of the activity goals as; *"I am teaching to one 5th grade classroom this year. I have 2 students who are 9.5 – 10 years old. There are ones who are younger than others. There are big differences in terms of months. There are such kinds of differences, they can be very stubborn, and they repeat what they continuously say like a stubborn pre-school student, and they are close to communication and do not hear what I try to say. They only say what they want to say and this may take 15 minutes of a lesson. They might have uncontrollable crying sometimes it is too much for them. A class period is 40 minutes, and if we use 30 minutes of the lesson, they want it to continue for 10 minutes, they want to leave after 10 minutes. For example, we make activities, they are interested in the design of the activity, they are curious, but they do not think about the purpose of the activity, about the reason of doing it. They only see that they jump up and down there; let's suppose we make a sound experiment, we will spill the salt on a balloon, and put the balloon on a speaker so the salt will get into motion. They need to see the vibration of the sound, but they only see the jumping, and they might listen to the rhythm of the music and daydream, and do not listen to anything about the salt or sound…"*

The teacher coded F8 expressed her opinions on students' cognitive and physical readiness as; *"Indeed, there are great differences in an academic sense. Older students or students who are older in months can understand and grasp our initial sentences instantly. But the younger students have difficulties in terms of orientation and getting used to the teacher. Their academic success is also lower. Additionally, children are physically different from each other. There are students in the classroom who are 1.50, 1.60 m, and also children who look like 3rd grade students. This situation causes problems in the classroom, and it is important"*

The teacher coded M2 stated his opinions on students' desire to play games as; *"…they bring their toys to the classroom"*. The teacher coded K15 maintained that *"I can tell you that I have one student who wants to drive cars all the time… unfortunately… Iuın uuun uuum. For example, I was teaching the frictional force and conducted experiments on the issue… They are based on observation, you set the environments, and need to make comparisons. So you use a car, a toy car."*

The teacher coded F5 remarked her opinions on seeking special attention as *"So I could give more attention to the children. That's what I could have done. In addition, I have tried to talk to them in a different way; I've tried to be closer to them. We are normally treating them like this but I've tried to internalize it with these students more because your words and expressions impact this age group much more. When I've realized it, I've started to pay more attention. Normally I try to put.. [boundaries].. I try not to act like a mother, but I try to make them feel this. Because they are more.. fragile."*

As is seen in the teachers' statements; the students who were 5th grade in the school year of 2016-2017 had cognitive, affective and physical inadequacies compared to the students in the previous years and continued to display childish behaviors, which brought along discipline problems. In addition, it was indicated that the students faced problems such as being unable to understand the purpose of activities and having a shorter attention span.

3.4. Experiences of the science teachers in teaching to 5th graders in the school year of 2016-2017

Table 5 shows findings concerning the differences between teaching to 5th graders having started primary school younger than 72 months old and students from upper-grade students.

Table 5. Teaching differences between 5th graders (including 60 month old) and upper grades

Teaching differences between lectures delivered 5th grades and to upper grades	Frequency
Benefitting from visual support	14
Using smart boards most frequently	11
Making plenty of activities	8
Conducting experiments	8
Playing games	5
Teaching subjects simpler	5
Making plenty of repetitions	4
Showing special attention	3
Making the lecture entertaining	2

In terms of the differences between lessons delivered to 5th graders and lessons delivered to students from upper grades in the 2016-2017 academic year, teachers expressed that they benefitted from visual support and used smart boards most frequently.

The teacher coded F13 states her opinions on using a smart board, making plenty of activities, benefitting from visual support and conducting experiments as; *"They do not understand the questions by any means. Therefore, I make plenty of experiments, and we already have a smart board. I use every kind of image there. They make teaching more effective"* The teacher maintained "*I definitely need images (visual support). I need to provide them with everything in a concrete way. I have to show them in a concrete manner"* and added that *"It is impossible without experiments"*

The teacher coded F16 shared her opinions on playing games as *"In terms of visuality, as science course includes abstract concepts, straightforward teaching is not possible at the 5th-grade level. After a certain point, you give up concerning about the classroom management. I particularly benefit from the smart board. I try to deliver classes on EBA via animations. We already deliver lessons through games. I mean, when you enter a classroom with a small experiment material, you find shining eyes to learn about it. That's to say, you can adapt them to lessons easily. They can also be alienated from the lessons very easily, they lose their attention quickly. Therefore, I try to use visuality while I am delivering my lessons"*

The teacher coded F14 shared her opinions on showing special attention as; *"Yes yes, it is definitely like that… In the simplest term, you can caress their heads and say, 'You can do it, I trust you'. I need to show a bit more attention by sitting next to the students and say you can do it in this way while his/her friends are solving problems of course".*

As is seen in the teachers' statements; the teachers need to make the science lessons more concretize and visualize in 5th grades including the students who had started school younger than 72 months, they have a higher tendency to use the board and conducted more activities. They associated students' inadequacy of achieving with abstract thinking.

4. Results and Discussion

In the current study investigating the opinions and experiences of science teachers about teaching science to 5th graders and to students who started to school by 60 month old, it was revealed that the teachers found this process as challenging and demanding for both themselves and children.

The participants evaluated the teaching science lessons to 5th grade students by science teachers from two different perspectives: being field specialist and recognizing the characteristics of students. Majority of the teachers participating in the current study consider the delivery of lessons to 5th grade students by branch teachers positive as they are expert of their field. The findings of the research studies conducted by Demir, Doğan & Pınar (2013), Epçaçan (2014) and Aytaçlı & Gündoğdu (2018) revealed that majority of the teachers find the delivery of lessons by branch teachers positive. Also, in the study conducted by Ozden, Kilic & Aksu (2014), the primary school teacher indicated that it would be useful for students to meet their branch teachers in the 5th grade in terms of revealing their interests and talents. However, teachers indicated that they had difficulties as they were not informed about the characteristics of 5th grade students who they taught for the first time. Behaviors such as students' continuing displaying their primary school behaviors, expecting the attention that they received from primary school teachers, seeking for approval for everything they do and keeping complaining are new for teachers, and this situation was expressed as a problem in terms of delivery of lessons and classroom management. Similar findings were also expressed by the social studies teachers in the study conducted by Zayimoglu Ozturk (2015) and mathematic teachers in the study conducted by Aytaçlı & Gündoğdu (2018). The childish behavior of students' and teachers' incapacity to lower themselves to students' level were indicated as another kind of difficulty. This situation stems from the lack of information of science teachers on the characteristics of this special age group and the presence of very young children among the students. Indeed, this was expressed by some of the teachers. The findings of the research studies carried out by Buldu & Er (2016) and Şentürk (2016) which demonstrated that even the primary school teachers are unprepared to teach children who start school at an early age and need support show the importance of this problem once again. In a similar way, the study conducted by Arı (2014) demonstrated that early schooling has a negative impact both on primary school teachers and students, teachers are discontented with this situation and demand the withdrawal of this implementation. Furthermore, Epçaçan (2014) also stated that the majority of the primary school teachers who participated in the study expressed that they face difficulties in terms of the application of the 4+4+4 system.

The teachers noted that they deliver more activity-based lessons to 5th grade students, and they need to use more images. The teachers maintained that they find the easiness of the 5th grade curriculum, absence of the TEOG Exam anxiety, and eagerness of students to participate in lessons positive. Also, in the study conducted by Ciray, Kucukyilmaz & Guven (2015), a part of the science teachers stated that the content was alleviated, which they found to be positive.

In terms of the comparison between 5th grade students in the 2016-2017 academic year and in previous years, the teachers pointed out that students face difficulties in terms of cognitive, emotional and physical readiness for the 5th grade, and this situation is more obvious in younger children. Moreover, they mentioned that these children have a short attention span and seek for special attention. They expressed that they need to use images in lessons and support the lecture with smarts boards, they teach the subjects with plenty of activities, deliver the lessons through experiments, and that they play games. Taking these statements into consideration, it is possible to suggest that majority of the students are still in the concrete operational stage. The given situation is supported by the teachers who expressed that they need to concretize subjects, teach them with games, make

activities and frequent revisions. When the fact that there is a presence of 9-9.5 year-old children among the students is considered, these results should not be surprising. Similarly, in the studies by Karadeniz & Ulusoy (2015) and Zayimoglu Ozturk (2015), the social studies teachers stated that they had a difficulty in teaching students' abstract concepts. Considering that there were 9-9.5 year-old children among the students, this is not so surprising. Because although Piaget suggests that children go into the abstract operational stage at around the age of 11 (Charles, 1999), there are some studies asserting that children cannot display the features of the abstract operational stage at that age even though they are accepted to be in it. For example, the research study carried out by Çepni, Özsevgeç & Cerrah (2004) addressed 7th and 8th grade students. The findings of the study revealed that most of these students are not at the operational stage. Another research study conducted by Demirbaş & Ertuğrul (2012) with a total of 300 students from 4th, 5th, 6th, 7th, and 8th grades to determine the degree of operational skills of students revealed that students' realization of skills regarding the operational stage was low. When the fact that in the period when the two aforementioned studies were conducted children started school when they were 72 months old (6 years old) on average, the seriousness of the current situation can be better understood because, a 5th grade student was 120 months old on average in the year 2012. However, there were students who started primary school in 2012 and became 5th grade in the 2016-2017 when they were just 108 months old (9 years old). This 12 month-difference is considerable for this age range. Moreover, the findings of the studies conducted in the years 2004 and 2012 revealed that secondary school students' skills regarding the operational stage were low despite the fact that students were one age older. A number of previous studies determined that secondary school students do no acquire most of the abstract thinking skills (Adey & Shayer, 1990, 1994; Aktaran Çepni, Özsevgeç & Cerrah, 2004).

During the interviews conducted with the teachers, findings concerning different situations were encountered besides the research questions. One of these findings is that there were teachers who stated that there are classrooms with an age difference up to 1.5 years. The previous research studies showed that there is a major difference between age averages in classrooms (Arı, 2014; Doğan, Demir & Pınar, 2014; Cerit et al., 2014; Uzun & Alat, 2014), and there are classrooms which have age differences up to two years (Akbaşlı and Üredi, 2014; Sahin & Guzel, 2018). In many studies, it has been argued that even the age difference spanning up to 12 months can be a serious problem for children (Bedard & Duhey, 2006; Crawford, Dearden & Meghir, 2017; Googlad & Anderson, 1987; Puhani ve Weber, 2005; Sahin & Guzel). Thus, a 1.5 year difference (18 months) can cause very important problems. This is a problematic situation both for teachers and students. When the differences among children who are born in the same year are considered (Kaila, 2017), the importance of 1.5-2 years of age difference can be understood because this age difference leads to cognitive differences and cognitive differences can vary even depending on the month of birth (Crawford, Dearden and Meghir, 2017). Crawford et al. (2017) conducted a study in England and found that the children one year older than the younger children have higher academic scores. Teaching to students with different cognitive skills in the same classroom can be challenging for cognitively less developed students (Bedard & Duhey, 2006) and can slow down the cognitive development of cognitively more developed students because this age difference brings about cognitive differences. As a matter of fact, the findings acquired from the study conducted by Unver, Dikbayir and Yurdakul (2015) with the first-grade teachers support that claim. The teachers indicated that it was necessary to take more care of children younger than 72 months and it was possible that children older than 72 months were neglected.

A delay in children's school starting age results in children's being more mature when they start school (Dee & Sievertsen, 2015; McEwan & Shapiro, 2008); thus, children who start school without reaching the required maturity confront problems in many areas. Similarly, in studies conducted in Britain, Norway, Belgium and America, it was found that children starting school relatively earlier are confronted with more difficulties (Navarro, Garcia-Rubio, Olivares, 2015). These findings also support the finding of the current study. The problem that is most frequently expressed by teachers is the cognitive and physical incompetency of children who are younger than 72 months. Several research studies conducted with primary school teachers showed that children who are younger than 72 months experience the orientation problem more intensively (Cerit et al, 2014). Eğitim Bir Sen (Education Union) (2012) indicated in their study conducted with teachers and parents that children who start primary school at an early age learn more slowly than children who are older than 69 months and face great difficulties in courses. The interviews conducted with teachers regarding the 2016-2017 academic year showed that there are only two teachers who stated that they did not have any difficulties. In response to this finding, their students' birthdates were examined, and it was seen that all of the students were

older than 70 months when they started primary school. On the other hand, one teacher stated that he/she faced great difficulties due to the fact that two-thirds of the classrooms consisted of early age group students. As the findings demonstrate, teachers' problems increase with the increase in the number of children who started primary school at an early age. Similar findings were also obtained in the research study conducted by Arı (2014).

Both national and international arguments are continuing on the school starting age and its effects. Yet, no study focusing on the problems experienced by the children starting school relatively earlier in the upper grades has been detected. In addition, there are some studies exploring the relationship between the early school starting age and academic achievement. For instance, Bedard & Duhey (2006) made comparisons on the children taking TIMSS exam and found that the children starting school relatively earlier have lower math and science scores in the 4th and 8th grades. Arnold & Depew (2018) reported that early school starting age has negative effects on the male students' rate of graduation from high school but did not affect that of the female students. Puhani and Weber (2005) and Fredriksson & Öckert (2005) found that educational gains of the children starting school when they were 7 years old instead of 6 years old are more. Dee & Sievertsen (2015) noted that starting school relatively later positively affects mental health.

As is seen, it is considered an important problem for children who start school at a younger age to take lessons that require abstract operational skills without having sufficient cognitive development. Because abstract thinking skills have an important role in terms of succeeding in the science course (Lawson, 1982 cited in Çepni, Özsevgeç & Cerrah, 2004), for students who start primary school at an early age without developed abstract thinking skills, science courses could be considerably challenging. This situation gives rise to the development of negative attitudes towards the course and damages one's self-confidence (Sharp, 2002; Sharp & Hutchison, 1997; Çepni, Özsevgeç & Cerrah, 2004). However, in Turkey does not have the luxury to lose these children. The question of which courses should be given at which developmental stage is of great importance. Early experiences of children have an important role in terms of their future cognitive, social and physical development (Baber, 2016). There is a positive correlation between schooling age and educational outcomes (Bedard & Duhey, 2006; Kaili, 2017) and cognitive development (Dhuey, Figlio, Karbovnik & Roth, 2017). Therefore, schooling age and curriculums should be regulated by taking these facts into consideration. Similar to the current study, in many other studies, it has been reported that starting school at an early age is a problem (Crawford, Dearden and Meghir, 2017) and it has been suggested that the school starting age should be increased (Bedard & Duhey, 2006; Dee & Sievertsen, 2015). Thus, it is believed to be necessary to review and rearrange the school starting age. In addition, although the school starting age was rearranged and removed to 66 months were in the 2019-2020 academic year, it is still a problem that students can start school from 60 months depending on the parents' preference. School starting age should be determined as 72 months and the contents of courses should be determined on the basis of children's cognitive, affective and kinesthetic characteristics. In addition to this, it is necessary to raise teachers' awareness of developmental features of students from different age groups and provide trainings in this respect.

One of the most important factors determining the quality of an education system is the effective planning of curriculums, age groups and levels of schooling from the beginning of the pre-school period to the end of the secondary school period. Elementary and secondary education not structured in compliance with the developmental characteristics and needs of students will not yield the anticipated outcomes even if it is supported with quality equipments, qualified human power and high budgets (Akbaşlı and Üredi, 2014). Early childhood experiences will have significant impacts on children's affective, cognitive and physical development. Thus, all the levels of schooling and course contents in different levels should be taken into consideration while deciding on the school starting age for children.

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