EJPCE
Eurasian Journal of Physics and Chemistry Education
Eurasian J. Phys. Chem. Educ. 1(2):70-76, 2009

Thoughts of pupils at primary school level about the practical usage of electricity as a means and the source of energy

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Abstract
This study was made to determine whether or not the primary school students` have the concept of "electricity" in their life and what they know about electricity. This page was focused on the students' thoughts about the use of electricity. This application was completed in a village school. Although there was a grade difference between classes, the answers which all of the students gave were similar to each other. The students replied the questions because of the concepts which they learned and saw through their social life not their book knowledge's. The interview was applied with students in a suitable class in their own school. The questions were discussed with students alternatively. The students were wanted to write down their own answers on papers by taking place on desks. Finally, when the students' answers were appraised, it was observed that some students had very interesting ideas about the produce of electricity.

Keywords
Electricity, Primary school students, Use of Electricity

Introduction

Science education has faced to face some positive changes and it has been saved through influence of the ancient education understanding. In past years, whereas the studies and applications which were relating to traditional education methods were well to the fore, now the idea which the students reach new knowledge's themselves and they understand and commented the knowledge's themselves has occurred not to buy knowledge's readymade. In other words, the student understands and configures the new concepts and conceptual constructions himself/herself with knowledge's which he/she has. As Kuhn (1972) defended, which takes place in Learning in Science and The Science of Learning (Novak, 1988): while foreknowledge change and regenerate in time, new information's happen and this period is repeated. In this wise, it has been understood that information has started to get away from influence of some approaches and to have a new point of view about comprehension. This new approach has brought to light "Constructivist Approach". A constructivism curriculum must include methods which militate against excessive compartmentalization and fragmentation. According to constructivist approach, human brain isn't like an empty plate. The student learns and processes and comments the knowledge's and configures new knowledge's. The teacher only guides and leads the way the students.

Thanks to arising new approaches, the relationship between learning and teaching has come to light for science education in schools. As specified in "Constructivist goggles: implications for process in teaching and learning physics" (Pope and Watts, 1987), Kelly (1955) has put forward this theory with "Personal Contruct Theory" which has included an innovative view. In studies made at the present time, the connection of this theory has increased quite and it is observed that the constructivist emphasis predominates on psychology, sociology and physiology.

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ISSN: 1306-3049, ©2009

There are some studies which are opposite this approach from the past to day. Namely, while there are people who support the idea that old lifestyles and pre-knowledge are effective on comprehending the current knowledge, there are researchers who are of the opinion that someone having old ideas won't be able to comprehend there solutions in a new environment and be productive. Although some researchers have had different studies about learning, scientists have focused on the same ideas. Some of the common ideas have been as follows:

- The concepts which have been realized early in life are not only illusive but also long lasting opposite the change.
- The ancient knowledge's are influence about being learned new concepts.
- The student don't notice whether her/his intellectual process is ready for learning.
- The knowledge can be committed within specific limits.
- That all concepts are accepted like new information follows a specific order (Novak, 1988).

When we take these ideas into account, we need have some backgrounds to be gained meaning somethings that we see and hear. In other words, the aggregations provides real learning, and when these aggregations create a meaningful whole by confederating the "Concept" definition comes to light. Thus, concepts are thought as they are components which complete and integrate each other. If the students superimpose knowledge's or concepts on new situations, the learning is materialized. According to new system and approach, when concepts learned are associated with daily life, permanent learning comes true. The information increases, and the information masses which are created grows day by day. In this way, the concepts which the students can make use of should be thought by choosing. When some studies made which concepts on science education are thought increases.

One of the concepts which we face to face and increase the use of everything, technology is also "electricity". The electricity and electric energy have very important place in our life. This study was made to bring to light whether primary school students had information about electricity and electricity's produce or what their ideas about "electricity" were.

In the literature studies, some studies which included that the students' ideas about electricity were coincided like this study. One of things realized in these studies was that the primary school students generally hadn't enough information where electricity came from but they had some own theory. In this study, the primary school level students couldn't answered by combining with electricity and energy. A research report included that some students said that electricity was a sort of energy (For example; Keinonen, 2007). Certainly, the cause of these differences has been effective the locations where students lived and their schools. The students participated in this study were a village school students. Therefore, the geographical location, the school sizes were effective to their answers. The findings about these students' understandings concerning electric would be useful for teachers to try different ways to understand the electric concept in classes. There are a lot of studies which are useful for teachers while they teach "electricity" subject (Learning in Science, Children's ideas in science (chapter 3), Electrical work in school, Electricity and Magnetism). Besides, some studies have made about students misconceptions on electricity concept (Secondary school students' misconceptions about simple electric circuit).

The purpose of this study determined the primary school level students' thoughts about electricity's produce, use of electricity and where electricity cames from. Finally, these findings compared with each other and some literature studies.

Method

This study was applied in a primary school, in a village, in Trabzon. The total of participants of this survey was 30 students. 10 students were chosen from every classroom which were 4th grade, 6th grade, and 8th grade. The students from 4th grade were 9-10 ages, the students from 6th grade were 12-13 ages, and the students from 8th grade were 14-15 ages.

The "case study" method was used to determine that the students had ideas about electricity. This method was applied at a heartfelt atmosphere mutually by not being put anything like desk between the researcher and students. Then, the findings were collected by using interview method.

This application was evaluated by using qualitative studies and the findings were analyzed with qualitative research methods. After this application, the students were wanted to write down their answers on papers by passing their desks. The answers which were on the pupils' papers weren't written in findings section because their answers were the same as answers at interview.

Findings

In interview made with pupils, the answers which the pupils gave answers have been in four tables which are as follows:

Table 1: Number of participants of the survey, fourth and sixth grade and eight grade pupils' answers to question 1

	Pupils Responses		
	grade 4 (9-10 aged)	grade 6 (11-12 aged)	grade 8 (13-14 aged)
Number of participants of the survey	10	10	10
1) What comes to your mind when you think of electricity?	- Edison - Light, Lighting - Lambs - Sun - To use the light as frugal	- Electric cables, electric switch - Science - Utility poles	- Technological tools - Television, computer - Love - Light - Science laboratory - One of the most important factors in our life is electricity. - Social solidarity.

(All responses haven't written in Table-1 again, because some students gave the same answers.)

In the first table have been showed thoughts of pupils in 4th, 6th and 8th classes what came to their mind when they thought of electricity. The responses which 4th grade (9-10 aged), 6th grade (12-13 aged), and 8th grade students gave to all questions were gathered into four different groups. Secondly, the pupils gave some answers about the importance of electricity in their life and said their ideas about produce of electricity. Informations in Table-3 include the pupils' thought about where the electric came from. In fourth category was showed whether they had ideas about using electric for some tools if we hadn't electric in our life.

Table 2: Number of participants of the survey, fourth and sixth grade and eight grade pupils' answers to question 2

	Pupils Responses		
	grade 4 (9-10 aged)	grade 6 (11-12 aged)	grade 8 (13-14 aged)
Number of participants of the survey	10	10	10
2) Where do you use "electricity" in your life? If the electricity weren't in your life, what could you face to face with?	- To operate the tools - At hospitals - In tunnels - In houses - If the electric weren't in our life, patient could die at hospitals, - The lighting couldn't be in our life.	It is used : - at lift systems - in cars - in schools. - If the electric weren't in our life, - some tools couldn't operate - We couldn't work.	- If the electric weren't in our life, - communication could be difficult, - Socialization and travelling couldn't be in our life. - food could rot -burglary could increase.

(All responses haven't written in Table-2 again, because some students gave the same answers.)

Table 3: Number of participants of the survey, fourth and sixth grade and eight grade pupils' answers to question 3

	Pupils Responses		
	grade 4 (9-10 aged)	grade 6 (11-12 aged)	grade 8 (13-14 aged)
Number of participants of the survey	10	10	10
3) Where does the electric come from to houses? What do you think about electric's produce?	-Water is increased in barrage, than electric is produced. - There are some machines which collect the instance waves, than it comes to house with cables. - Electric is produced from seas.	It is produced -with oxygen and global warming - with sun light, - with water, - with wind, - with propeller. It comes from - transformer - dynamo - electric cables.	It is produce -in electric station - in water station in barrage - from natural gas. - with wind energy - with sun energy. It comes our house by isolating with earth cable.

(All responses haven't written in Table-3 again, because some students gave the same answers.)

Table 4: Number of participants of the survey, fourth and sixth grade and eight grade pupils' answers to question 4

	Pupils Responses		
	grade 4 (9-10 aged)	grade 6 (11-12 aged)	grade 8 (13-14 aged)
Number of participants of the survey	10	10	10
4) If we were a location without electricity and we had some tools operating with electric, how could we operate these tools? Or how could we provide the lighting?	- Light can be provided through tools' cables. - We can reach the electric by using water. - We can use battery. - We put a cable in gas-lamb, than we fix a lamb point of cable than the lamb can glimmer.	- We can use sun energy. - We can use earth cable. -We can make a hand wheel, put a dynamo, than water turn the hand wheel.	- There is an electric fish in the sea. We can take and use it for electric. - We can use generator. - We can take advantage of electrifacion with rubbing.

(All responses haven't written in Table-4 again, because some students gave the same answers.)

After the interview, the pupils were wanted to write down things that come to their mind when they were asked the questions which they were asked at the interview time. The responses which the pupils wrote on papers were observed the same as the others. The students gave the same answers both interview and in writing. When some students' papers were investigated: it was realized although they talked at interview time, they didn't give enough responses to questions.

Discussion

After this study, when studies in the literature were investigated common findings were found between this study and the others as the students thought and knew about electricity. For example; in a research in the literature contained that students said that electric bulbs, switches, cables came to their mind when electricity was said, and they said that electricity was used as a heat and light energy (For example; Learning in science). According to the findings in this page, the primary school students generally had some information about operating mechanism of the tools worked electric. A lot of students who were younger than the others (for example; 9-10 aged) worried about electrical safety. This worry of some pupils was understood through an answer which was a student, grade 4: "If children touch the electric outlet, they can be shocked." With these students who have such these thoughts, it is very important to talk about electrical energy and electric current. Studies in the literature have also addressed children's' understandings of the concept of electric, electric energy. Most of the studies have showed that children think that electric is very useful for our life. Because of this research, the primary school students were thought that they might have had misconception as electricity was produced directly with water and sun energy. Besides, in this pages, children 13-14 aged were not clear about where electric comes from, they hold many different theories about its origin and electric's produce like the result of Tuula Keinonen (Finland)'s study (Sixth grader's thoughts on electricity)

Results

After the interview, when the students' answers were investigated, it was realized that they generally answered the question as similar to each other. Most of pupils in 4^{th} , 6^{th} , and 8^{th} grades have known that electricity had an important place in our life, and they were able to explain this importance by giving examples in their daily life.

When the question of "What comes to your mind when you think of electric?" was asked the students, three different grade students were also answered as the same as each other. The pupils generally gave some examples by associating electric and social life and relating using area of the electric in their daily life.

Firstly, Tuğçe, grade 4, gave an answer as follows:

- Electricity can be dangerous. Because children can touch the electric outlet.

She mentioned that electricity was able to be dangerous for people.

Secondly, Burak, grade 6, gave an answer as follows:

- When I think of electric, electric transformer comes to my mind. They are boxes which all electric cables are collected the same place. They save leak electric. They provide that electric current is conducted easily and the electric comes to our house thanks to the electric transformer.

He described electricity from different points of view.

After first question, the pupils talked about that we would have had some difficulties if electricity hadn't been in our life. In addition to the answers in Table-1; Serhat, grade 6, talked about this subject as follow:

- Electricity is used in hospitals. When a heart has stopped beating, an electric shock is given, and the patient doesn't die.

This answer was realized that it was the same as a student gave answer in Tuula Keinonen's study.

In the third category; The pupils said their ideas how the electric carried to their house. They told something which they saw by guessing.

All students groups said that electric carried with electric cables and utility poles to houses. About electric's produce, Yağmur from, grade 4, talked as follow:

- Water is more important than electricity. Water is collected in barrages. When the barrages are opened, water current accelerates. When fast current is materialized, electric is produced. If water weren't in our life, there wasn't electricity.

She wanted to describe the electricity's produce.

In the fourth category, some interesting ideas happened in this research. The pupils said own ideas as answer in consideration of this question: "If we were a location without electricity and we had some tools operating with electric, how could we operate these tools? or how could we provide the lighting?" Timur, grade 4, talked about this subject as follow:

- I provide to operate and get hot my tool by reflecting the sun light to a mirror.

Feyza, grade 6, said:

- I make a hand wheel to put in watercourse. Charging generator attach to hand wheel. When water turns the hand wheel, dynamos also operate.

Tolga, grade 8, said:

- I rub battery and stone each other, so that the firing can be formed. Then, I charge the battery with the firing, and I use it.

The answers in the fourth question show that the pupils thought of electricity from different of view. The students participated this study generally had some information about the importance of the electricity in daily life, the electricity's produce, and the portability of electric. Merely, all students in this research gave answers approximately about electricity without distinction of age. They all said that they thought of electricity some concepts like cable, lump, technological tools, etc. came their mind. They told that it was used in hoses, hospitals, schools, lighting systems, etc. and it came from cables, utility poles, etc. and if we were an area without electricity, we could use battery, generator, accumulator, etc.

Suggestions

Nowadays, taking students' thoughts into consideration during the development of curriculum and teaching materials is a situation that is pointed out and accepted by all researchers. There some studies related to the development of students' conceptual understanding about electric and electric energy. Thanks to these studies, the knowledge levels of the pupils at primary school levels can be learned about concepts which are related both physics lesson and daily life. This situation reverberates education and teaching positively. The researchers and the teachers can determine the students' thoughts or misconceptions thanks to these researches. As this study is understood, the educators should pay attention the teaching concepts which especially are used in daily life.

The findings reached at the end of this study can make known one's opinion about the subject that the education is changed and grow. Most of the researchers studied about this subject can benefit from such these foundations. This page can show the researchers who studied about education whether the primary level students have enough information about the concept of "electric", and related to the subject of the electric's produce, and the use of electric. As a consequence of this, the teachers and researchers can benefit from a lot of studies such this study for their researches and studies.

Finally, in science education can be started to be studied related to new understandings and approaches thanks to a lot of studies like this page.

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