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Misconceptions About Between Physical and Chemical Changing of Matters of Primary School Students

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Abstract
Most of countries are trying to develop their education systems. Since the new generations are their future, they want to give a good education. So they have the biggest objective of their educational system to educate modern, productive responsible, qualified and educated people who also take side of solutions instead of problems. The educated people are educated very hard because of education problems. Education systems and educator to be forced the students' problems. These problems particularly are about such as misconceptions, erroneous conceptions, limited conceptions… The most important of the problems clot in the misconceptions. For this purpose, I researched misconceptions about between physical and chemical changing of matters in the primary school students.
Keywords: Chemistry, misconception, physical and chemical changing of matters.

Introduction

Scientists are arguing that abstract thinking is starting eleven years old of the children (Piaget, 1970; O'Loughlin, 1992; Chaput, 2001). If in these years, the abstract thinking is learned, the students won't learn concepts, also they will only learn by heart. Although educator also tries to learn a lot of things, the students will learn to erroneous or limited (Nelson-Jones, 1996). We can see that the impetus of the education into students' misconceptions is a concern that they interfere with learning the intended science content and that they therefore need to be overcome (diSessa, 2006).

Some authors assert primary importance for misconceptions in learning science. Vosniadou (2001) stated that "science learning is characterized by misconceptions" (p. 179), on the grounds that they have been extensively reported in the literature, that they are often resistant to change, and that they have been replicated in studies in different parts of the world. Novak (2002) asserted that meaningful learning implies supplanting misconceptions with valid conceptions and those misconceptions operate to distort new learning. Hammer (2000) showed that physics education research has mainly considered student misconceptions to constitute obstacles to learning. He cited about messing and emphasized that this was certainly not to suggested that ''messing about'' was the entirety of science learning; it was to suggested that messing about may play an essential early role, and that educators ignore this role at their students' peril. Learning science could not end with ''messing about,'' but it may need to begin there, just as learning to draw must begin with scribbling. To insist from the beginning that children's drawings be ''correct'' (bear a good resemblance to what they say they were drawing) would be to prevent them from learning to draw. For similar reasons, science education may need not only to tolerate but to encourage the equivalent of scribbling in early learning.

In a review of research on student misconceptions of chemical bonding, Özmen (2004) noted that these misconceptions become a hindrance in acquiring the correct body of knowledge. In a case study of one student, Taber (1995) demonstrated that the student's alternative framework about charges acted as a block to learning about chemical bonding. Some studies are suggested that such "blocks" or "obstacles" to learning need to be weakened or even abandoned before a new conception can develop (De Posada, 1997; Hewson&Thorley, 1989), and that such conceptual change requires rational considerations on the part of the learner (Carey, 1999; Strike& Posner, 1992). Furthermore, some authors have proposed that misconceptions will constitute very different problems for learning depending on the ontological status that the learner ascribes to a certain concept (Chi, Slotta, & deLeeuw, 1994). Smith et al. (1993) presented empirical evidence that students successfully utilize prior conceptions to learn more advanced knowledge, and questioned to what extent misconceptions interfere with learning expert concepts. According to Bergquist and Heikkinen (1990), it is critical to provide students with opportunity to verbalize their ideas to promote concept building and remediate misconceptions. Only then will deep-seated misunderstandings be identified, diagnosed, and addressed. Wheeler and Kass (1978) investigated to determine the nature and extent of student misconceptions in chemical equilibrium and to ascertain the degree to which certain misconceptions were related to chemistry achievement and to performance on specific tasks involving cognitive transformations characteristic of the concrete and formal operational stages of thought. They used Misconception Identification Test (MIT), a 30-item multiple choice test, was developed to require the student to predict the effect of changing certain variables on the equilibrium conditions of selected chemical systems. They also were investigated six major misconceptions: (1) mass vs. concentration, (2) rate vs. extent, (3) "constancy" of the equilibrium constant, (4) misuse of Le Chatelier's Principle, (5) constant concentration, and (6) competing equilibrium. Ninety-nine grade-12 chemistry students in four classes (three teachers) participated in their study. Upon analysis of the data, the researchers concluded, among other findings, that students operating at the early or late concrete levels may benefit from a greater emphasis on a laboratory approach in which they can predict and then observe the effect of varying certain variables on a chemical system at equilibrium. Hiebert and Behr (1988) interpreted a number of studies as showing that middle school students' numerical knowledge of additive relations has interfered with learning various multiplicative relations such as proportional reasoning. As an aid to interpretation, students were also asked to give reason for their answers to five randomly chosen items.

Matrix Method Description (MMD)

Although eleven years old is the critic age on the understanding of misconceptions (Piaget, 1970; O'Loughlin, 1992; Chaput, 2001), we can see that misconceptions are the very important roughly all education states. Because of erroneous learning things in the early ages will continue to following students' education life. So we urgently determine to misconceptions of students' minds and remove the students learning problems. Particularly, it's very important in education system. For this aim, we researched misconceptions about between physical and chemical changing of matters in the primary school students. We used to interview method only. The interview was about question-answer to the students and educator. The question was directed to primary school students about 30 students which were to receive education in the Besime Özderici Primary School.

Results and Conclusion

First of all, we must understand that the students are known what is physical and chemical changing. So we asked them what is physical and chemical changing. They answered same things approximately.

A physical change in a substance doesn't change what the substance is. In a chemical change where there is a chemical reaction, a new substance is formed and energy is either given off or absorbed.

This answer was the true answer what we expected. The some questions were directed to the students about examples of physical and chemical changing. Which are physical changings and which chemical changings are?

- Dissolved of ethyl alcohol in the water
- To smell rotten or putrid of meal
- Electrolysis of water
- Scattering of ink in the water
- Burning of coal
- Fermentation of yogurt
- Turning yellow of a paper on the sun
- Reflectivity of light on the glass
- Extracted of detergent to dirty
- Solid sodium in the water
- To grind of wood

The students given to good answers with easy questions of “Dissolved of ethyl alcohol in the water”,“Electrolysis of water”, “Scattering of ink in the water”, “Burning of coal”, “Reflectivity of light on the glass” and “To grind of wood”. They claim that these were a typical physical changing and not any changing internal structure of matters. But they confused the other questions. They did not decide to physical or chemical changing. Especially, some students don’t know anything about biologic phenomena, for example; fermentation or rotten of meal. Some one claimed that these were physical changing, because of the matter changed with external structure. The others were not decided.

The other problem was about chemical changing “Extracted of detergent to dirty” and “Solid sodium in the water”. It was the strange that they only waited chemical changing extracted to dirty on a wear. Because the detergent a chemical, so this phenomena ought to chemical changing. They don’t know about this progress is about firstly chemical and then physical changing. Then someone had been shown solid sodium experiment that answered a chemical changing. The reason was that they observed burning in the water when added solid sodium. But the others claimed that sodium dissolved in the water as a sodium ion.

Also, some students argued that example of “Scattering of ink in the water” was chemical changing. Because, they thought that the water taken to internal structure changing, so observed change of color. But they were not accepting to chemical changing of turning yellow of a paper on the sun. According to students it was a physical changing.

So, we observed some misconceptions about physical and chemical changing issue on the students. We realized that the students have a little experiment physical and chemical changing and don’t know structure of matter, exactly. Because of they don’t know very much knowledge about changing of matter to one state and the other state, they confuse to conceptions. This is a little investigation about misconceptions of students in the issue of physical and chemical changing, but this study is emphasize of important points (Piaget, 1970; O'Loughlin, 1992; Chaput, 2001; Tezcan & Bilgin, 2004) .

Conclusion

Some misconceptions were determined to the students about physical and chemical changing. They think that the main problem is about they don't about matters, structure of matters and occurring phenomena. Some researchers were to emphasize these problems. This problem may be dissolving with given very much examples when explain to the students or do with laboratory experiments very much as suggest of Tezcan and Bilgin (Tezcan & Bilgin, 2004).

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