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'Are Mass and Weight the Same?' Activity Developed based on Quantum Learning Model and Teachers' Opinions*

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Abstract
The aim of this study is to teach 7th grade Mass and Weight unit in science course to the students through an activity developed in accordance with the Quantum Learning Model (QML) and to present it to the applicants and to get the opinions of the teachers. This study was carried on within the context of the case study approach, the literature on quantum learning was examined through literature review. Then, an activity was developed based on the quantum learning cycle in the determined subject. Finally, this activity was shared with four science teachers and semi-structured interviews were held on them. This study is intended to be a guide to teachers and researchers involved in developing similar activities. When the literature is examined, it is understood that the courses carried out based on the QLM have positive effects on the academic achievement and attitudes of the students. Therefore, it is planned to increase the number of the activities developed in this study and apply it on the students within the experimental method.
Keywords: Quantum learning, Science activity, Mass, Weight, Teacher

1. Introduction

The aim of the life-long learning approach is to teach them how to use this knowledge, how to apply and gain knowledge and skills in life, rather than conveying the present knowledge to the learning of the individual. In this purpose, new methods and techniques have developed as educational activities. In the related literature, it is suggested that the teacher should use different approaches, methods and techniques in the classroom teaching activities to make the information presented to the students to be permanent. One of the suggested approaches is the Quantum Learning Model (QLM).

In 1900, quantum theory was introduced by Max Planck, the quantum concept which means the energy package emerged by the black body radiation experiment (Aygün & Zengin, 2006). In the 1970s, based on the Quantum Learning, which emerged from the quantum physics and emerged as a synthesized state of many new theories, it is based on Suggestopedia studies developed by Georgi Lozanov. The concept of quantum learning was developed by Bobbi DePorter in the United States in the 1980s as a result of the quantum energy being defined as "interactions that converts energy into light", and includes suggestopedia, accelerated learning techniques, NLP, right-left brain theory, triple brain theory, auditory, kinesthetic, multiple intelligence theory, holistic education, experiential learning, metaphorical learning, simulation, emotional intelligence (DePorter & Hernacki, 1992).

The quantum learning model is one of the models with important factors such as research being effective, effective applications, amusing learning environment, communication skills and the acquisition of high level cognitive skills (Usta 2006). The skills are taught to the students in the quantum learning model such as academic skills and lifelong learning skills. Academic skills are quantum reading, writing, memory and note-taking. Lifelong learning skills are 8 keys to excellence, creative problem-solving skills and communication skills (Demir, 2006).

According to the quantum learning indicated to be appropriate for learners of all age groups and styles, learning consists of a complementary and following six-step cycle. The abbreviation is Quantum Learning Cycle (QLC) known as EEL Dr. C; Enroll, Experience, Label, Demonstrate, Review and Celebrate stages.

Enroll - getting to students to buy into the "What is in It for Me" framework
Experience - creates a common experience to which all learners can relate
Label - provide the key words, concepts, models, formulas, strategies - the input
Demonstrate Provide opportunities for the learners to "show that they know"
Review - Provides the learner with ways to review the material and solidify that, "I know that I know this."
Celebrate - An acknowledgment of completion, participation and acquisition of skills and knowledge.

Each stage reveals the whole relationship in the learning-teaching process and guarantees that learners who are independent of class level, target audience and content are not interested and interested in every lesson (DePorter, Reardon & Nourie, 1999). In addition, this cycle should include academic skills and lifelong learning skills (Demir, 2006).

Quantum learning emphasizes that the individual must realize himself. This provides for the acquisition of lifelong learning skills. Lifelong learning skills; Creative problem solving in this context requires the individual to notice the problem, to hypothesis and test, to think differently and to develop a solution. Therefore, considering the facts of a teacher when he/she applies activities to prepare according to the quantum learning model will contribute to the permanence of the information that the students receive. The use of the quantum model in the teaching of science, which is in a whole with life, is not at the desired level. However, the greatest learning difficulty in this area is science subjects and concepts that are incompatible with students' perceptions and perceptions of everyday life.

Purpose of the Study

It is aimed to present the effects of this study, which is developed in accordance with the quantum learning model related to 7th grade Mass and Weight topic of science, to present it to the applicant and to take the opinions of the teachers.

2. Methodology of Research

General Background of Qualitative Research

Within the context of the case study approach, literature studies were conducted and the studies on quantum learning were examined. Then, the activity was developed based on the QLC in the determined subject. Finally, this activity was shared with four teachers and semi-structured interviews were held on them. One of the teachers is female and the others are male, and all the teachers' professional experience is over twenty years. In the next section, the data are presented in a lesson plan format, and the teacher opinions on the developed activity are presented in the question and answer format.

3. Results of Research

In this section, 7th grade science class is presented in the form of a lesson plan for QLC related to 'Mass and Weight', and teacher opinions on this activity are presented respectively.

Sample Activity

Unit: Force and Energy

Subject: Mass and Weight

Class: 7

Acquisitions:

7.2.1.1. By describing the gravitational force acting on the mass as weight, it defines the weight as a force and measures its magnitude with a dynamometer.

7.2.1.2. Comparing mass and weight concepts.

1. Stage: Enroll

The subject is introduced to the students by telling a story that can attract their attention. For example; When Hakan came home from school one day, his mother lifted Hakan and said; "Ooh how heavy you are, did you ever weigh?" Hakan tells her mother that he wanted to be weighed. Mom says he can use the scoop in the bathroom. When Hakan scales, he sees 50 on the sculpture screen. Mom says it's your bullshit. But Hakan's brother says he shows his weight. Hakan decides to ask his teacher because he is confused. "The teacher who reads this story in the class is told to the students; "Does your scale measure Hakan's mass or weight?".

It receives possible answers from the students. Possible answers from the students: It measures the mass, because the scale shows the unit of kg!

2. Stage: Experience

At this stage students form a mind map based on their knowledge of mass and weight concepts. The previous information is polled. Feedback is given to students' answers and the missing places are

completed.

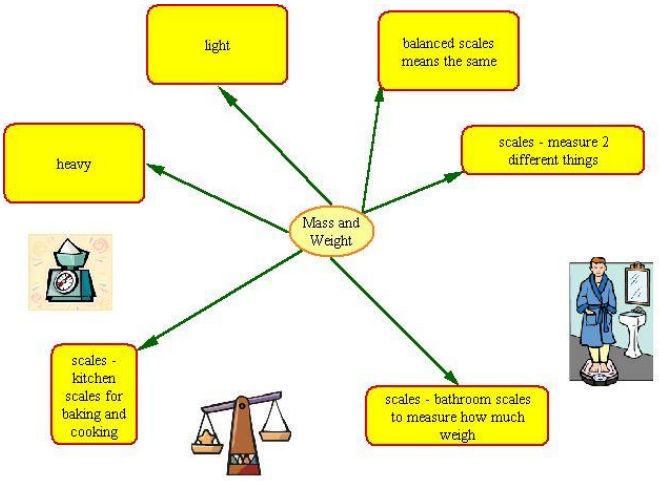

Figure 1: Mind map (Url-1, 2017)

What is the weight?

The force of gravity, which acts on an object, is called weight. It is indicated by the symbol G. The weight is measured with a dynamometer because it is a force which is a vector and has magnitude and dimension. Unit for weight is the Newton. It is indicated by the letter N in short. Weight is a vectoral magnitude.

What is mass?

The mass is the amount of unchangeable substance. It is indicated by the symbol m. Measured with equal-arm scales. Unit for mass is kilogram. The mass is a scaler magnitude.

Figure 2: Equal-arm scale and dynamometer (Url-2, 2017)

3. Stage: Label

At this stage, students are asked to prepare a comparison chart based on their knowledge. Students are asked to express what they have done by giving right to speak.

4. Stage: Demonstrate

At this stage students are asked where they meet the concepts of mass and weight in their daily life. Brain storming is made. The teacher corrects the mistakes.

The possible answers given by the students are that they meet these concepts in the markets, in the butchers, in the kitchen, in the food packages, in the pharmacies etc.

5. Stage: Review

Equal-arms scale, dynamometers and bascule are brought in class. Students are asked to make

measurements with scales and dynamometers by giving different weight objects such as wood, telephone, bag filled vegetables. The students are asked which object is measured with which tool. Their answers are noted.

6. Stage: Celebrate

Students are divided into 4 groups. Various questions are asked related to the acquisitions. The group that give the most correct answers to the questions is given by the Q, L and C shaped cookies.

Teacher Interviews

The common answers given by the four teachers in the interviews are: they usually use question-answer, narration, discussion and demonstration methods, there is no information about the quantum learning model, they think that this model can help the lessons to be more enjoyable and productive after the quantum learning model and example activity and that the quantum learning model can be effective, especially when the misconceptions of the concept are eliminated.

4. Discussion

Teacher-centered expression is not enough to educate individuals who can investigate and question traditional teaching practices such as grading. In this context, students can use quantum learning model and lecture instead of traditional methods. Academic skills such as quantum reading, writing, memory techniques, effective note-taking techniques, and lifelong learning skills are activities that students can adapt day by day, where they can learn many things from their own mistakes. Therefore, with the QLC, the knowledge of the students will be permanent. After the activities developed in the context of the QLC and presented to science teachers, it has been concluded that the QLM will be more enjoyable, attracting the attention of the students, and effective in eliminating the misconceptions of the students in formal or informal way. These results are similar to the related literature (Acat & Ay, 2014; Barlas, 2002; Benn, 2003; Çakır & Arıkıl, 2012; Demir & Gedikoğlu, 2007; Kanadlı, Kerim & Karakuş, 2015; Myer, Pedigo & Terrell, 2005).

Barlas (2002) found that students in the quantum learning class were academically more successful than students in the traditional classroom in their work on 7th and 8th grade students at the Westfiel public school in the USA. Benn (2003) investigated the effects of the QLM on the success of the basic academic courses in different US states, and found that the schools implementing the QLM were more successful than the other schools. Myer et al. (2005) found that quantum learners had a positive effect on students' learning abilities and showed significant increases in science and mathematics readiness levels. Ay (2010) investigated the effects of science and technology teaching based on the QLM on academic achievement, classroom attitudes and self-learning skills. As a result of the research, it is seen that QLM is effective in self-learning with academic achievement in attitude. The Learning Forum investigated the impact of quantum learning on academic achievement in the Grossmont Unified High School District in the USA in 1993. 63% of students with poor academic achievement have an academic grade point average above 2 (Le Tellier & DePorter, 2002).

4. Conclusions and Implications

According to the researches made in recent years, it seems that different methods and techniques have begun to gain importance based on the basis of fun-active teaching-learning centered approaches. The quantum learning model's skills and current education programs overlap. In this context, the suggestions developed based on the research results are presented in order. Teachers should be informed about activities in in-service courses about contemporary teaching methods such as quantum learning model. Activities should be presented in the scope of QLC for subjects and concepts in which students have misconceptions and, QLC should be organized according to every stage of learning difficulties and readiness.

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