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Review Article

An Investigation on Quantum Learning Model

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Abstract:

Today, the importance of education has increased even more in terms of raising qualified individuals. According to researches on the development of upper mental skills and abilities, it has been found out that students who are actively involved in the learning process learn beter. In result of information interactions, treasury is changing and increasing. To adjust to this changing, people have to improve their skills and abilities effectively; hence, various methods and techniques have been developed in education. One of them is quantum learning which a model is becoming widespread. This research includes a literature review regarding quantum learning model and suggestions given light of the related literature.

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INTRODUCTION

According to Newtonian physics based on observations, the world was thought to contain a large number of observational information that could be analyzed with a number of laws and principles. Because this concept of force reduced the whole to a few simple pieces and identified events with solid cause-and-effect relations, people began to see themselves as isolated areas that were only connected to each other by force and activity. Human behavior was mostly determined by biology, ground and conditions (Khun et al., 1990).

Quantum theorem can be applied to physical reality at every level, unlike this classical paradigm. Quantum means the smallest piece, that is, particle, a small energy package that can not be divided. In quantum events usually It is not possible to know what, how and how it will come to fruition. The quantum physics assumes that new properties will emerge when simple entities join or relate. Accordingly, the whole is larger than the sum of the parts. Each piece of quantum has a versatile capacity that will affect the world. The quantum paradigm is complete. It lines up with this: We will know more about assets and systems, when they are seen as a whole (Demirel, 2008).

While many social scientists think that they can be satisfied with a single paradigm in their work, the developments that have taken place have caused change in the social sciences where the Newtonian paradigm is dominant (Khun et al., 1990). This change also affected training programs. Quantum learning keeps things together to create meaningful information using all the neural networks in your brain (Vella, 2002). Quantum learning aims at realizing the individual as a whole, moving from the findings and assumptions of the quantum physics. In this direction, it is important for the individual to form possible truths and question them, to evaluate them according to the circumstances in which events and facts are realized with a deductive approach, to perceive reality as a whole, to gain a subjective point of view and to avoid certain judgments (Demirel, 2008).

Bases of quantum learning is based on Suggestopedia studies developed by Bulgarian educator Georgi Lazanov in the 1970s. The concept of quantum learning has been developed by Bobbi DePorter in the 1980s in the United States, from the definition as "the interaction of light" (DePorter and Hernacki, 1992).

Quantum Learning Model

Quantum learning which emerged from the quantum physis and emerged as a synthesized state of many new theories covers the key concepts of many methods and techniques like suggestopedia, accelerated learning techniques and NLP, right-left brain theory, triple brain theory, learning styles such as visual, auditory and kinesthetic,

multiple intelligence theory, holistic education, experiential learning, metaphorical learning, simulation, emotional intelligence (DePorter and Hernacki, 1992).

The main goal of quantum learning is to realize the individual as a whole (Hanbay, 2009). It is argued that this approach, which is mostly used in language teaching, is important for inspiration to influence learning outcomes and for suggesting every detail in the class. Baroque style music in the classroom, sitting comfortably, increasing individual participation, the attitudes and behaviors of the teacher is important to create positive suggestions (DePorter and Hernacki, 1999; Mihaila-Lisa, 2003; Minewiser, 2000). Quantum learning, which is indicated to be appropriate for learners of all age groups and styles, is based on the five basic principles listed below (DePorter et al., 1999):

1. The classroom environment, body language, design of lessons and lecture notes, and more are all found in the learning environment. The ideal learning environment includes appropriate light, purpose-selected colors, positive affirmation posters, plants, props and music.

2. Everything is done for the purpose. Because the lessons work carefully in orchestral order.

3. Our brain is more successful with complex stimuli. Learning is more effective if new learning is associated with things that are experienced outside of learning.

4. Learning involves risk. But learning becomes more comfortable if the learning environment is made fun. If the student follows this step, he sees learning safe and provides superior skills.

5. If someting is worth learning it's worth celebrating because appropriate feedback creates positive emotional associations with learning.

Some of these principles listed above also form the basis for the establishment of the quantum learning design framework. According to quantum learning model, learning consists of six interrelated phases.

Quantum Learning Cycle

Quantum Learning cycle whose abbreviation known as EEL Dr. C has taken its name from the initials of the phases that make up this design and each stage reveals the entire relationship of parts in the learning teaching process. This design can be used to stimulate learners' natural learning desires; using quantum learning design framework can increase interest and motivation (DePorter et al.,1999). This model occurs of six stages that are Enroll, Experience, Label, Demonstrate, Review and Celebrate. Grade level guarantees that learners are interested in every lesson regardless of target group and content area (DePorter et al., 1999). With this framework learning becomes dynamic, easy and lasting. This design encourages student success; enables learners to make their learning experience life, practice and makes content meaningful for learners.

Detailed information on these six stages is listed below:

1. Enroll: the students will be attracted the attention and the curiosity is woken up at this stage where the connection with the real world is established and the interest about the subject is established. At this stage, the student understands that the subject is related to his/her own experiences, contacts with them and assumes responsibility for learning. Students are expected to create the question "What is here for me?" and to be curious. For this purpose, a short story, a striking question, pantomime, sketches or a short video can be used. In other words, at this stage the lesson can start with an activity that will awaken the curiosity of the students and a general picture is drawn by taking advantage of student experiences on what to expect from this lesson.

2. Experience: At this stage, the learners' preliminary information is actuated to increase the sense of curiosity and need to learn. In this phase occurs rational questions such as “what?” “why?”. This phase where the learner is ready to learn; benefit from the brain's natural learning/exploration desire. This phase is the beginning of the next phase. Ensure that learners establish links with prior knowledge of the subject and make sense of the content; games, simulations, mnemotechnics, mind maps, team work and activities can be used. The following questions can be a guide for teaching lessons in designing this stage: What is the best way for learners to acquire knowledge? Which game or activity will motivate learners' existing knowledge and make them feel they need learning?

3. Label: In this phase, which built on the learners' curiosity and where innovations are added on preliminary knowledge; the brain's natural labeling and identification needs are exploited; information, formulas, reasons and places are labeled. Experiences provide the opportunity to teach students through their past experiences by linking to the power of the current knowledge and curiosity of the learners. At this stage where thinking skills, learning strategies and concepts are taught; colors, graphics, supporters and posters can be used. The following questions can be a guide for teaching lessons in designing this stage: What distinctions should be made in the learning of learners? What can be added to the meanings of the learners? Which strategies and thinking tools are useful for the learners to know or use?

4. Demonstrate: At this stage, the learner is given the opportunity to receive new information, combine with other information and practice in different situations. Because experience is necessary to make sense of the information received; earners can internalize knowledge in this way. This stage is essential to show what learners know, to establish connections and to practice. In addition, giving learners the activities they can learn, gives them confidence by providing them with a sense of what they know. At this stage; team work, demonstrations, original video footage, posters, games, songs, note taking and graphical illustrations can be used. The following question can be the guide for teaching the lesson in designing this stage: 'How can they show the level of proficiency in new information they have?'

5. Review: At this stage where the neural networks of the brain are strengthened and the acquired knowledge and skills are learned in the brains of the learners, the feeling of "knowing what I know" occurs and thus the sense of self-confidence develops. It is important that this level is appropriate for the level of development of the students, that they have multiple intelligences and appeal to different senses. The following questions can be a guide for teaching lessons in designing this stage: "What is the best way to repeat this learning?" "How can each learner's ability to repeat?"

6. Celebrate: At this stage "I suceed" sense occurs on learner. Events to be held during the celebration may vary. At this stage, for example, competitions can be held to entertain learners and help them enjoy their new knowledge. Celebration stage creates positive association, positive emotions and confidence in learning; provide feedback on the process; einforce learning; motivates learning again and again and increases the desire to achieve. The following questions can be a guide for teaching lessons in designing this stage: 'What is the best way to celebrate this learning?' 'How do you report everyone's success?'

Studies on Quantum Learning

In this section, the researches and their results carried out in Turkey and abroad related to quantum learning are given.

Quantum Learning Network is an educational and training organization for quantum learning activities in Oceanside and California states of The United States which is established as 'Learning Forum'. As an important event of Quantum Learning Network, training seminars are organized with Supercamp programs and students participating in these seminars learn quantum learning principles and academic skills such as fast reading, note taking techniques, memory techniques, writing. In our country, they have to be applied as 'Supercamp Turkey' in recent years. (Usta, 2006; Demir, 2006).

A study was conducted by Vos-Groenendal (1991) to determine the academic achievements and attitudes of students who participated in supercamps between 1983-1989. According to the results of the research, the motivation scores of the students who participated in Supercamps increased by %68 compared to the pre-tests. The increase rate of the academic achievement grades of the students was determined as %73. %84 increase was observed in the self-esteem of the students and it was determined that % 96 of the students who participated in the program continued their positive attitude despite learning. Later, it was determined that the students continued to use the skills at the rate of %98 in the scale developed for the students to use quantum learning techniques in the school environment.

A study was conducted on the impact of the quantum learning model on academic achievement by Learning Forum, in the Grossmont Unified High School District in the USA in 1993. According to the findings, the number of students with academic achievement between 3.0 and 4.0 increased by %4. In addition, the number of students with academic achievement between 2.0 and 3.0 increased by %14. As a result, %63 of students with weak academic achievements had an average academic grade above 2 (Le Tellier and DePorter, 2002).

The Learning Forum company conducted a survey in 1996 examining the impact and academic achievement of quantum learner, which was formed by Northwood High School in 1996, on student performance. According to the results obtained after the quantum learning training; The students' linguistics and the number of students who took notes in the linguistics and reading lessons were examined and an increase of %21 was observed in the numbers of these students before and after the program. Students' vocabulary and vocabulary skills in pre- and post-processing social communication were examined and an increase of %13.8 in word usage scores and %1.5 in word definition test scores were observed in social communication. In the math skills exam, the students showed %100 success.

A research was conducted by Nourie (1998) to determine the effectiveness of quantum learning. According to the results of this research; achievements in mathematics and English classes of students who are participating in quantum learning training and who are at a lower level than the 9th grade standards are at grade 9. In addition, students' problem-solving skills in mathematics classes have also increased significantly. There was a difference of %5 in the success rates of the quantum learning education classes with normal classes. The attendance of students attending the seminar decreased, the attendance of the classes increased, following class rules increased and the school behaviors improved. Students also point out that teaching in quantum learning classes is fun. There was a significant increase in student perception rates before and after the program. It has been observed that teachers are seen to develop in learning techniques and styles, to take risks, to communicate with students, to open up new horizons to students and to motivate them effectively.

Barlas and others (2002) conducted a study to investigate the influence of quantum learning on students' attitudes toward learning, self-confidence and academic achievement in Carpentersville, USA. This study included 7th and 8th grade students, parents and teachers. The Illinois Standard Achievement Test results were examined to compare the academic achievement of students. According to the results obtained after the application of quantum learning; In the 7th grade social and 8th grade mathematics

results, the rate of elimination of this problem in the students who met the standards and had learning difficulties increased in the class applied to quantum learning. The students with high self-esteem and those with learning disabilities have higher self-confidence levels at quantum learning class. In addition, the views of the parents support these results. According to the results of the research, students who have received quantum learning training perform better and the confidence of the students themselves is increased. It has also been achieved that the teachers participating in the practice are more successful than the traditional teaching because of enriching the learning environment, using more music than the traditional class, celebrating students' learning and using visuals to provide students' thoughts and reminders.

Benn (2003) conducted a study to investigate the effects of the quantum learning model on the achievement of students in basic academic courses in the 2001-2002 academic year. According to the results of the research, the quantum learning model has a positive effect on the academic achievement of students in 18 different schools in 4 states in the USA. It has been found that the academic achievement, mathematical skills, reading and writing skills of students who have received quantum learning education increase statistically and educationally significantly compared to non-educated students.

Myer (2005) conducted a study to investigate the effects of quantum learning on reading skills, general mathematics inventories, social, science and mathematics lessons in 2004-2005 academic year. This study was conducted with three third-graders. Mathematical inventories and readings of the students who were given quantum learning education were evaluated and it was determined that they increased in reading and mathematics skills. In addition, the level of readiness of students in social sciences, science and mathematics courses has been increased. The views of third-grade teachers in practice also suggest that quantum learning practices enhance the development of students.

Demir and Gedikoğlu (2007), made an experimental study with the aim of determining the effect of quantum learning model on the students' academic success at secondary education level and the changes in the students' self perception and beliefs about the course, school and learning. According to the results, the difference between experimental and control group was statistically significant. It was seen that there were positive changes in the students' beliefs related to the course, school and learning. As for the students' self perceptions, there was increase in their self confidence, responsibility and creativity. It was found out that perceive themselves in a more positive way. The students believed that they could use the knowledge they had received in their courses and their daily lives.

According to the results of the research made by Güllü (2010), affect of the quantum learning model on students' academic achievement and their attitudes were found to be positively directions.

Ay (2010), carried out a research with the aim of investigating the effect of quantum learning model in science and technology education to the academic success, attitude towards lesson and self direct learning seventh grade students of primary education. At the end of the research, it was determined that quantum learning model had positive effects on success, attitude and self direct learning in science and technology lesson. Girit (2011), carried out a research to analyse the effect of the quantum learning model on the academic success, anxiety level and attitude towards mathematics of seventh grade students. At the end of the research, it was determined that quantum learning model had positive effects on academic success, attitude and concern level.

The purpose of the study made by Çakır (2013) was to investigate the effect of quantum learning model based instruction of "The structure and properties of matter" topic on students' academic achievement, attitudes towards science and technology course and logical thinking skills. As a result of the study, it was found that students' academic achievement, attitudes towards science and technology course and logical thinking skills were improved positively based on the instruction of "The structure of matter and its properties" with quantum learning model.

Acat and Ay (2014), made a study with the aim of examining the effect of quantum learning approach on primary school 7th grade students' achievement, retention and their attitude towards the science course. As a result of the study; quantum learning approach affected students' academic achievement, retention and attitude marks in a positive way. Yilgen (2014), carried out a research in order to identify quantum learning approach's effects on seventh grade students' academic success. In the experimental study and in academic success test meaningful differences have been appeared in favour of the experimental group. It has been thought that this research aiming to test effects of science education based on quantum learning approach on students' academic success would guide researches and experiments in the light of prospective results.

Şöhretli (2014), made a study to investigate the effect of quantum learning model on primary school 4th grade students', in mathematics lesson at "Of fractions to the areas" unit, academic success, science process skills and attitudes towards mathematics. At the end of research, it was determined that quantum learning model had positive effects on academic success and science process skills but for the results of attitude towards mathematics there was no significant effect statistically.

Demirboğa (2014), carried out a study to determine the views of candidate teachers about quantum learning aproach. It was determined that candidate teachers haden't got any clear prior knowlodge of quantum learning approach. It was detected that candidate teachers mostly found important quantum learning approach by virtue of providing easy learning, permanence and different perspectives. It was found out that a large part of candidate teachers wanted to use quantum learning approach in the future. On the other hand, it was found that some of candidate teachers found ineffective quantum learning approach because of time consuming, inefficient in crowded classrooms and unsuitable for every lesson and it needs extra materials. It was detected that applied quantum learning education was contributed to professional experience and personal characteristic of candidate teachers.

Alaca (2014), conducted a study to examine the effect of quantum model of learning in science teaching on sixth grade students' academic achievement, attitudes and retention of learning. As a result, in science classes quantum learning model's effect on academic achievement and attitudes weren't found to be significant. However, the effect of the persistence on learning was found to be positive. Çırak (2016), made a study to investigate the effect of blended learning supported by the quantum learning design framework on student achievement, motivation, social-cognitive-teaching presence and perceptions and to determine the effective components of blended learning. The findings revealed that there was a significant difference in terms of academic achievement, motivation, and research group scale scores between the students participated in blended learning supported by the quantum learning process and the students participated in only blended learning process. When the students' perceptions on this learning process were examined, it was found that there was a consensus on the positive sides of the process, they were content with the activities like displaying and repetition as they required active participation, and they attached importance to the role of the instructor. With these interviews, the effective components of blended learning were determined as follows: teacher roles, activities specific to design, the features of learning management system, face-to-face courses as complementary to on-line courses, the features of on-line course materials, student-student interaction, testing and assessment process, students roles, and extracurricular on-line participation.

Şimşek (2016), carried out a study to investigate the effects of quantum learning model on students' academic achievement, their attitude toward science and technology course, motivation toward science learning and the knowledge retention in science and technology course. As a result of the study, it was identified that quantum learning model significantly increased the academic achievement at 8th grade on "Cell division and heredity" unit in comparison with the control group. It was found that quantum learning

model increased the students' motivation and attitude toward science and technology course while it decreased in the control group, however, these increases and decreases were not significant. Furthermore, it was shown that quantum learning model significantly increased the knowledge retention in comparison with the control group. Consequently, it was determined that quantum learning model had a positive effect on students' academic achievement, attitude, motivation and knowledge retention in the science and technology course.

When the results of the researches carried out examined; it is seen that the quantum learning model has helped learners to improve learning achievement skills, has affected students' attitudes towards the lessons positively, has increased their readiness levels and made learning more enjoyable because of organizing the learning environment to address multiple learning senses.

SUGGESTIONS

It has been determined that quantum learning is a positive influence on students' academic achievement and self-confidence. Therefore, these suggestions can be given: organizing reinforcement program especially for students with poor academic achievement, exhibiting posters and phrases that positively impact students in classrooms and workplaces, using proper music during class and at various events, organizing courses and programs to improve the academic skills of students, informing teachers and students about learning styles, informing the students about how to organize course work environments, giving in-service trainings to teachers about using active language in communication with students and organizing courses for students about studying and problem solving strategies.

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