

THE DEVELOPMENT OF COMPUTER ASSISTED INSTRUCTIONAL MATERIAL ABOUT TYPES OF RADIOACTIVITY DEGRADATION IN NUCLEAR CHEMISTRY*

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ABSTRACT

The aim of this study is to develop computer assisted instructional material including story and animations produced by using the Flash programs for the “Types of Radioactivity Degradation” in nuclear chemistry. A story called “Guess who we are?” is improved in order to take students’ attention to the lessons, improve the period of students’ keeping the knowledge in their minds and use these materials in their daily lives. Animations about radioactivity degradation types are developed in the aim of explaining the degradation types and making these degradation types understandable. While developing those animations, both domestic and overseas web pages are searched and while being developed experts’ suggestions are taken into account. Lesson plan is preferred for pilot study. The pilot study of developed computer assisted instructional material is done with 18 students studying at 11th grade in Görele, Giresun. After the pilot study, the material was finalized by organizing the necessary parts. Considering that 11th grade Chemistry teaching program has come into force in 2010-2011 education year, it is believed that computer assisted instructional material developed in this study and including story and animations is an alternative source for the chemistry teachers and students.

Keywords: Types of Radioactivity Degradation, Animation, Story, Computer Assisted Instructional.

1. Introduction

Story, as its dictionary meaning, is to tell an account or recital of an event or a series of events, either true or fictitious verbally or in written form. Stories are effective in acquiring new concepts and development of the prediction and inference skills (Akyol, 2006). Sciences have the stories related to the interesting events and inventions in the world we live and our own life. The purpose of the story technique which has begun to draw attention in chemistry teaching, an important branch of science, is to relate to the daily life,

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to set the social and cultural structure properly in the sciences, to help the presentation of scientific concepts in daily situations and development of the students' attitudes towards sciences and to raise scientifically literate people (Demircioğlu et al., 2006). When the stories are included in teaching, the interest towards science increases and the concepts are considered to be beneficial for the individuals (Pilling et al., 2001).

Animation is the rapid display of a sequence of images or pictures on the screen (Burke et al., 1998). Moreover, animations are one of the teaching tools used to teach a subject or a concept effectively. Animations are the tools used efficiently in education due to their features such as flexibility, speed and convenience for data input (Marshall and Shipman, 1995). The animations used in science courses help the presented subject or the concept to be coded visually. If a learner both codes and constructs the content of the presentation both visually and verbally in his mind, she / he can realize the meaningful learning (Tasker and Dalton, 2006). Animations have brought a new dimension to science teaching with interesting, animated visual shows. With the help of the animations, the imagination of the children can be enriched and many abstract concepts in sciences can be explained to attract the attention of the students. Animations are not sufficiently used on their own in education but they are part of the education (Mayer and Anderson, 1991). It was examined that the studies conducted about animations in literature were used in diverse topics such as “chemical substances” (Wiley, 2001), “atp synthesis” (Huk et al., 2003), “flowering plants” (Akçay et al., 2005), “molecular biology” (McClean et al., 2005), “mole concept and chemical formula” (Pekdağ, 2005), “chemical bonds” (Ünal, 2007), “speed of chemical reactions” (Kolomuç, 2009), “optics” (Bülbül, 2009), “pace in our life” (Karaca, 2010), “chemical bonds and electrochemistry” (Karaçöp, 2010), “force and movement” (Şahin, 2010), “electricity in our life” (Türkan, 2010) and “chemical changes” (Tatlı, 2011). Although animations about different subjects in literature were developed, computer assisted instructional material where animations and stories about “types of radioactivity degradation” in Nuclear Chemistry unit together were not encountered.

When it is considered that 11th grade Chemistry Teaching Program came into force in 2010-2011 education year, the need for the materials developed for the concepts in nuclear chemistry (radioactivity) is obvious. In this context, the purpose of the study is to develop computer assisted instructional material which was made up of stories and animations intended for the types of radioactivity degradation in nuclear chemistry unit.

2. Method

The following steps were followed in developing computer assisted instructional material including story and animations:

- Animations related to “the types of radioactivity degradation” on the domestic and overseas websites were examined.
- Animations were prepared according to the views of the experts after the research.
- Animations which are thought to help the students understand the abstract concepts related to the types of radioactivity degradation better were prepared using Adobe Flash program.

- The story called “Guess who we are?” was developed to draw the attention of the students to the course, to build up a relation with the daily life and to help the students enhance the process of keeping the concepts in their mind.
- A single class period lesson plan according to the four-step 4E constructivist teaching model was prepared for the implementation of the pilot study of the computer assisted instructional material including the story called “Guess who we are?” and the relevant animations.
- The implementation of the pilot study of the computer assisted instructional material was carried out with 18 students studying in the 11th grade of an Anatolian Teaching High School in Görele, Giresun.

2.1. Lesson Plan Prepared According to the four-step 4E Constructivist Teaching Model Including the Story called “Guess who we are?” and the Relevant Animations.

Engage: After showing the students the examples which include the changes in atomic and mass numbers, preliminary opinions of the students about which types of radioactivity degradation they belong to are gotten. The sample display image including the change in the atomic and mass numbers was presented in Figure 1.

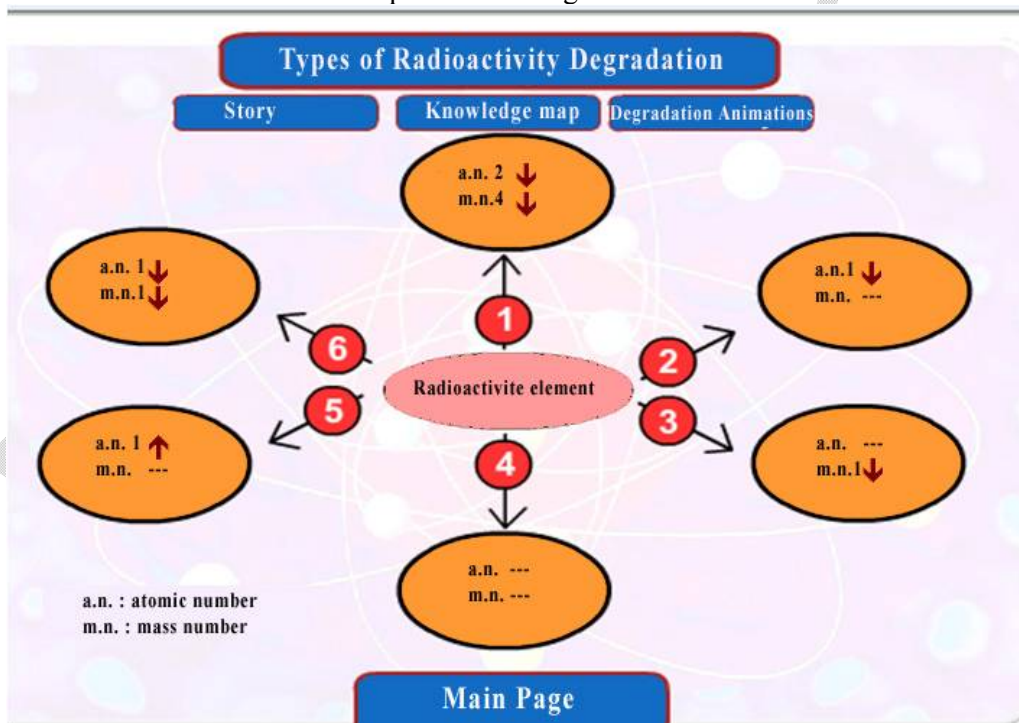


Figure 1. The sample display image including the change in atomic and mass numbers

Explore: A discussion session is started after having the students watch “Guess who we are?” and the teacher follows the discussion of the students as well as guiding them with the questions. Müge introduces her family in the story called “Guess who we are?” They are a family of five made up of father, mother and three children and it is stated that they are an undecided family. It is pointed out that their indecisive structure affects their life negatively and because of this, they want to come close to the stability zone, so they made various changes in each of their atomic, neutron and mass numbers in order to approach to the stability zone. The main display image of the story called “Guess Who we are?” was presented in Figure 2 and its sample display image was presented in Figure 3.



Figure 2. The main display image of the story called “Guess who we are?”



Figure 3. The sample display image of the story called “Guess who we are?”

Explain: Necessary explanations are made after having the students watch the animations about the types of radioactivity degradation. After these animations and the necessary explanations, the changes caused by atomic number and the mass number are examined. The sample display image related to the animations was represented in Figure 4.

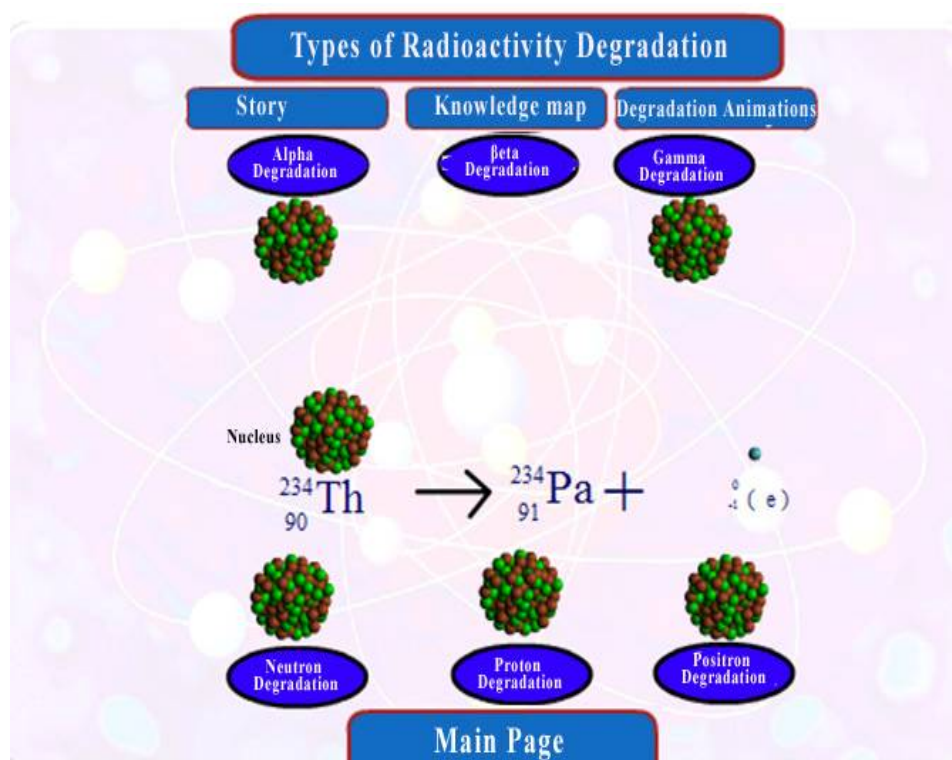


Figure 4. The sample display image related to the types of radioactivity degradation

Evaluate: After getting feedback, the students are made to do the examples about the changes in atomic and mass numbers which were shown at the beginning of the lesson. Moreover, the students are asked which types of radioactivity degradation the members of the family in the story called “Guess who we are?” represent and feedback is received.

3. Conclusion

During the implementation of the pilot study, it can be stated that computer assisted instructional material including animations and the story attracted the attention of the students and enjoyed by the students. There are many studies which determine that the use of computer assisted instructional material in chemistry / science teaching has a positive effect on increasing the student achievement (Kadayıfçı, 1998; Çelik 2005; Akçay et al., 2008). Akçay et al., (2008) determined in their study that during the teaching process

supported by computer assisted instruction, the passive students become active and they would rather have the teacher with a computer in the class. It is stated in the literature that computer assisted instruction will be able to be used in the class environment as an effective teaching tool (Schank, 1994; Yıldırım, 1995). In this context, it is thought that computer assisted instructional material developed within the content of this study can be an alternative source for the chemistry teachers and the students. Moreover, it is believed that this study will help the studies to be conducted about the concepts studied in Nuclear Chemistry and the other authors who are thinking of studying in this field.

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