International Journal of Contemporary Educational Research (IJCER)

www.ijcer.net

Physical Geography Teaching with 3D Simulation

Halil Mesut Baylak[1]
[1]Turkish Ministry of Education

To cite this article:

Baylak, H.M. (2016). Physical geography teaching with 3D simulation. *International Journal of Contemporary Educational Research, 3*(2), 65-70.

International Journal of Contemporary Educational Research
Volume 3, Number 2, December 2016, Page 65-70 ISSN: 2148-3868

Physical Geography Teaching with 3D Simulation

Halil Mesut Baylak [1*]
[1]Turkish Ministry of Education

Abstract

The main objective of the physical geography is to give a meaning to the natural environment. It is only possible with the implementation of the observation method to make the students perfectly understand the physical geography topics, in laboratory environments allowing the participation of all senses in teaching activity. In physical geography teaching, observation method is only applicable with the trips as its laboratory is natural environment. There is a need for new methods in teaching of physical geography topics to motivate the students, increase their interest towards the topics, bring them different perspectives, make the complex issues easier to understand for them, let them have quick and permanent learning and to make the abstract concepts concrete for them. There have been carried out studies and different theories to this effect. We have developed a new strategy using the latest technology against the problem of difficulties in observation-trip method in secondary schools. The basis of our strategy is to create a learning environment with "Physical Geography Teaching with 3D Simulation" model. With this model, the students will be able to experience the fieldwork and the teacher will be able to use the observation method.

Key words: Physical Geography Teaching, Geographical Laboratory, 3D Simulation, Observation Trip Method

Introduction

Today developed countries are researching education methods and techniques for critical issues such as increasing living standards by realizing socioeconomic development, problems encountered in effective use of natural environment and their solutions, the necessary consciousness for sustainable use of natural resources. They are setting new strategies in raising individuals who are scientific, contemporary and qualified for administering development of the country.

Foundation for understanding the nature begins with physical geography lessons. Essential points on which geography education is based are constituted of getting to know our world which supplies us space to live, providing insight on our interaction with nature and to benefit from it without damaging, creating awareness for the use of this learnt information in everyday life.

Being within the group of social sciences in education programs, geography tries to describe and interpret various aspects of humanity's home, the earth as an information category. The main questions that this discipline is in pursuit of are "where" and "why is it there"(Alkan,1998:148).

The main goal of physical geography is to make sense of the natural environment. A complete understanding of the physical geography subjects for secondary school students may be possible only through the application of the observation method in laboratory environments which will enable all senses to participate in teaching. The observation method in the physical geography, whose laboratory is a natural environment, can be applied only with the sightseeing. In the teaching of physical geography subjects, new methods are needed to provide positive motivation for the students, increase their interests for lessons and let them acquire different perspectives, make difficult and complicated matters easier to understand, provide fast and permanent learning, and turn the abstract concepts into concrete. Nowadays studies are being carried out for this reason and different theories are developed.

* Corresponding Author: *Halil Mesut Baylak, hmesutb79@gmail.com*

The trip-observation method is to make observations by going to the places where the events have occurred and continue to; finding out the correlations between the events by evaluating them on the spot (Garipağaoğlu, 2001:4). Correlations are significant in physical geography teaching. A wide variety of instructional technical materials are utilized in order to better explain and comprehend the topics, to express important and basic points of the topics, to keep the interest, attention and learning desire high. For this reason, the trip-observation method has a high potential. As long as the trip and observation methodology is used, the relationship of the school environment will develop better and many people around will know school activities and learners so that students will be more productive in finding better opportunities to explore, observe and learn about their surroundings (Demirci, 2005:143). According to the Ministry of National Education's teaching program no. 131 of secondary education, in the field of learning natural systems, dated 26.08.2011; the ability to use evidence and observation skills was evaluated as improving elements. During the application of the geography lesson curriculum, it is required to include and apply observing, terrain work skills.

Aim of the Study

This article aims to develop a complementary alternative solution supported by technology in the light of modern developments for the difficulties encountered in the implementation of the trip-observation method, which is highly needed in the teaching of physical geography subjects in secondary education. For this purpose, determining the current situation and the problems in practice constitute a complementary method that will contribute to the creation of proposals for the improvement of the quality of the geography course and to the enhancement of the efficiency of the courses.
Within the framework of this general objective, answers for the following questions are expected to find out.

a) Is 3D simulation method an effective method in geography lessons?
b) Is 3D simulation method an alternative for trip-observation method? and is 3D simulation method be able to integrate to trip-observation method?

Method

The article is based on analyzing the findings of the survey-based research and setting new strategies in the light of the findings. In the light of the results of the researches directed to the secondary school geography teachers, the level of application of the trip-examination method in the teaching of physical geography has been researched and the reasons for its inadequate implementation have been examined. The perspectives of the students towards the physical geography subjects and the problems they encountered are determined according to the research methods and techniques. It has been explained and identified as a new strategy in the context of technological developments to solve the emerging problems.

A questionnaire was used to determine the views of teachers and students in secondary education institutions. This survey was conducted on 135 students who were studying in 10th grade at the state schools and 38 geography teachers working in private and public schools. 59 of these students are females and 76 are males.

Results

The research, prepared in accordance with qualitative and quantitative research methods mixed methods semi-structured interview forms have been prepared. The research group is a likert-type interpretation of the data obtained by applying a needs analysis with content analysis the following conclusions were reached.

It is 100% that secondary school geography teachers give place to trip-examination method in their course planning. In the emergence of this ratio, the use of a common annual plan and the statements in the curriculum were effective. However, it has been determined that the application of this has decreased to 8%. The responses and ratios of the reasons for not being able to be implemented by the teachers are shown in Table 1:

Table 1. The reasons why Teachers fail to practice the travel- investigation method they Expressed.

The Answers	The Amount of Teachers (38 people in)	The Ratio of Answering (%)
The families do not want to go under this burden because there is a certain	21	55,2

amount of money for the trips.		
The school administration does not make financial contributions for sightseeing and they do not consider it as a teaching activity	16	42,1
There are long and complicated procedures for obtaining legal permits for sightseeing.	34	89,5
Administrative chiefs, school principals and families have negative attitudes that excuse traffic accidents.	19	50
I would like to spend the rest of the holiday rather than traveling because of the overload of the lessons when being asked to make the trips on weekends or holidays.	15	39,4

Although the teachers emphasize the necessity of applying the trip-examination method in terms of teaching physical geography subjects, they stated that they are subject to the application procedures given in Table 1 and permission procedures and low financial sources.

The students' answers of their expectations regarding the process of physical geography subjects, the course materials, and the methods are summarized in table 2:

Table 2. The expectations of students for the processing of lesson topics.

Answers	**Amount of students(people)**	**Answering rates (%)**
More visual content should be placed in lessons	97	71,8
Lessons should have lessons	118	87,4
Unnecessary information should not be taught	70	51,8
Teachers should make students love lessons	103	76,2
Teachers should teach lessons more effectively	111	82,2
More questions should be solved in lessons	16	11,8

In Table 2, it is seen that there is a desire of the students to select easy activities which are generally made up of visual materials and easy to understand. The same group of students indicated them as visual contents; the presentations as animations, films, maps, pictures and documentaries.

Discussion

One of the biggest problems in teaching geography is the shortcomings in the subject narration. Due to the reasons such as not being able to attract attention of the students and not being able to protect their attention for a long period of time during lesson, lack of motivation and actuality, lack of modern course tools and repertory; there are various problems in the teaching of the subjects.

The question that every geography teacher encounters at the end of every lesson and sometimes causes them think deeply is the question of "I do not understand this". The most important educational activity to answer this question is to do field work. Trips to geographical lands provide extensive experience for students. In this way, students combine many concepts and practical knowledge related to geography. Terrain experiences are very important for all geography students in terms of the improvement of the qualities of the students.

Thanks to increased technological developments, video cameras and portable computers, the works which have been done in the field and the gathered data make it easy to work on the field nowadays, as well as making it possible to evaluate them (Şahin-Özey, 2012:4). The data obtained in Table 1 form materials for subsequent usages. These materials facilitate the transition to the desired teaching method. The learning process is related to active participation, co-operation, the subjectivity of the individual, pluralist views, thinking and producing and how all these are reflected. The development of technology, more convenient and cheaper information circulation, access to information easily, and spreading of the written and visual media in a way people can create and change their thoughts require a versatile understanding of education. Constructivist theory can also

contribute important things in this context (Akınoğlu, 2004: 89).Since 2005; our country has started to apply the constructivist theory, which includes the evaluations of the students in table 2, in our education system.

Conclusion

The world of education has been influenced by the rapidly evolving technology. The use of technology has become widespread at every level of education. In the future, technology will be indispensable for education. Education services are one of the fastest-changing, renewing, updated and evolving services available today. Offering better quality education, increasing the success of learners and teachers, the way to use the information obtained correctly and sufficiently in daily and professional life requires following these improvements (Yazıcı, 2015:99). As a result of changes and developments in science and technology, it is expected that more qualified students will be educated and in order to educate these qualified students, it is necessary for educators to make learning environments more effective. It is also inevitable to utilize the teaching materials and tools in creating an effective teaching environment (Kazu and Yeşilyurt, 2008: 177). "Fatih Project" which is one of the most important reforms that our country has made in the field of education in recent years should be evaluated within this scope.

In physical geography teaching, basic education methods like verbalism, question-answer method, discussion etc are not enough so using brand new educational tools and methods in parallel with the continuously renewing world will ensure that geography education can be done with the highest efficiency in the right and lasting way. We need to be able to determine a strategy for the problem of not applying the trip-observation method in the light of our findings and on the basis of constructivism in physical geography. At the basis of our strategy, more success will be achieved through training with 3D simulation, which will acquire more success, increase lesson interest, comprehension and recall rates at 90% levels and enable learning by experiencing field studies, applying observation method in class environment and using the modern technology.

3D simulation applications start at the beginning of the 19th century. In 1838, completing the process of visual depth perception; Sir Charles Wheatstone has started to perceive 3 different sizes from two similar superimposed images. Later, by using this detection in the computer environment, simulation studies called theoretical or physical real system simulations and experiments were carried out and properties and behaviors are evaluated via computers. Today it is used to gain real driving experience in pilot training and driving courses. Now in geography teaching, it can be seen that terrain studies can also be done by 3D simulation and it is used as teaching material in 35 secondary schools including 16 state schools.

In simple manners, as shown in Fig. 1, two images are superimposed and the depth of view is generated. The view is based on passive or active glasses with each eye seeing the screen in sequence. The land in the left image and the elements of the animation on the land in the right image, create ripple waves with separate shots in the way it will form different angles. Students learn about the volcanic explosion and shaping by watching the images with 3D glasses.

3D simulation models used in situations not suitable for experimentation can be prepared in four different types, which are physical, method, procedural and functional. Physical geography subjects can be implemented with one of these different types and it is also suitable for implementing integrated.

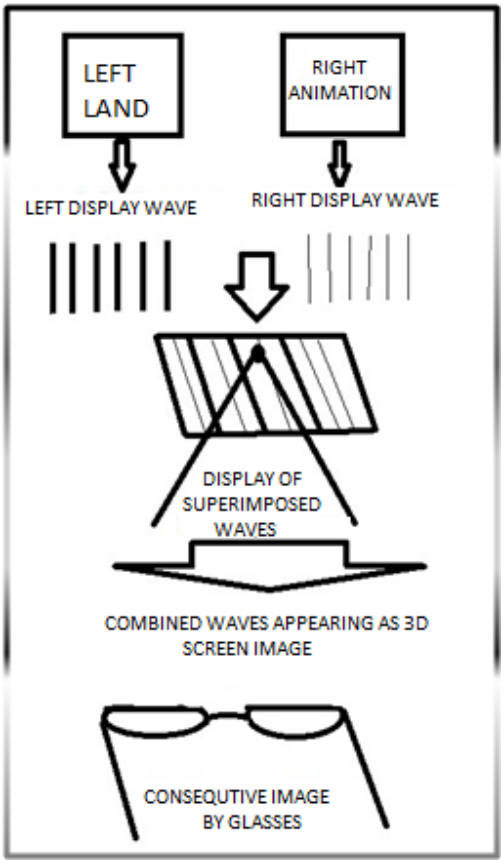

Figure 1. Simple 3D Simulation Image Creation Scheme.

In material development studies of geography lessons, contents that will enable 3 dimensional educations have started to be prepared. Examples of field work simulations with free programs including modeling, covering, rig and animator tasks such as especially 3D max, Maya, Reactor, and True Space can be prepared. Students' excitement is increased with prepared 3D simulation on physical geography.

These are the benefits of using 3D simulations that can be applied as a complementary alternative to the deficiency of the trip-observation method implementation:

a) It compensates the trip-observation deficiency of students.
b) It allows students to conduct examinations and experiments.
c) It forces students to think more open and broadly
d) The necessary data can be easily obtained and transformed for using in different situations as desired.
e) It can be used to demonstrate the functioning of a particular activity or process and to solve problems related to it.
f) It provides that students are given materials which due to cost and means can't be brought to the classroom environment, in a way that creates a sense of realism.
g) It ensures that the learning realize effectively.
h) It provides an easier understanding of the difficult issues to understand and learn.
i) It ensures that subjects are grasped permanently.
j) It ensures that students become more motivated in class.

The geographical laboratory which is unobservable outside, whose conditions cannot be established by researchers will develop the use of other teaching methods and techniques together with arrival of 3D simulation method at education environment.

The physical geography subjects prepared and spread through 3D simulation method will increase the application of the observation method. It will provide the learners grasp the topics in the laboratory environment. They, as individuals expected to gain all skills thanks to geography teaching will contribute to the development of the country.

References

Akınoğlu, O. (2004). Yapılandırmacı öğrenme ve coğrafya öğretimi. *Marmara Coğrafya Dergisi*, (10).

Alkan, C., & Kurt, M. (2001). *Özel öğretim yöntemleri: disiplinlerin öğretim teknolojisi*. Anı Yayıncılık.

Demirci, A. (2005). Globalleşen Dünyada Türkiye'deki Coğrafya Biliminin, Amaç, Metot ve Araç-Gereç Olarak Kendini Sorgulaması: Coğrafya Eğitiminde Yapılması Gereken Reformlar. *Ulusal Coğrafya Kongresi*, 141-149.

Garipağaoğlu, N. (2001). Gezi-gözlem metodunun coğrafya eğitimi ve öğretimindeki yeri. *Marmara Coğrafya Dergisi*, (4).

Kazu, H., & Yeşilyurt, E. (2008). Öğretmenlerin öğretim araç-gereçlerini kullanım amaçları. *Fırat Üniversitesi Sosyal Bilimler Dergisi, 18*(2), 175-188.

Özgen, N. (2011). Fiziki coğrafya dersi öğretim metoduna farklı bir yaklaşım: gezi-gözlem destekli öğretim. *Marmara Coğrafya Dergisi*, (23).

Şahin, V., & Özey, R. (2012). İngiltere'de lisans düzeyinde coğrafi arazi çalışmaları. *Marmara Coğrafya Dergisi*, (25).

Yazıcı, Ö. (2015). Coğrafya bölümü öğrencilerinin üç boyutlu görsel materyal geliştirmelerine yönelik deneyimleri: Karabük üniversitesi örneği. *Marmara Coğrafya Dergisi*, (31), 98-131.