Eğitimde Kuram ve Uygulama *2008 , 4 (2): 282-290*
Journal of Theory and Practice in Education *Articles/ Makaleler*
ISSN: 1304-9496 *http://eku.comu.edu.tr/index/4/2/aebozdogan.pdf*

PLANNING AND EVALUATION OF FIELD TRIPS TO INFORMAL LEARNING ENVIRONMENTS: CASE OF THE 'ENERGY PARK'

İNFORMAL EĞİTİM ÇEVRELERİNE YAPILAN GEZİLERİN PLANLANMASI VE DEĞERLENDİRME ÇALIŞMALARI: ENERJİ PARKI ÖRNEĞİ

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ABSTRACT
Informal learning environments which assist science education and complete the education at schools are very efficient especially on primary school students' gaining cognitive, emotional and psychomotor behaviors. In addition, students also improve their social skills by carrying out oral communication in these places. A new model is presented in this study to reduce the workload of teachers in schools which organize tours to newly-opened Energy Park in Ankara and to provide a chance to plan the tour in such a way as to provide a source for them. Preparation of new models for the other informal learning environments like this one will assist attaining the education goals of these locations.

Key Words: Informal learning environments, Science Education, Evaluation

ÖZ
Fen öğretimine önemli katkılar sağlayan ve okuldaki eğitimi tamamlayan informal eğitim ortamları; özellikle ilköğretim öğrencilerinin bilişsel, duyuşsal ve psikomotor davranışlar kazanmasında oldukça etkilidir. Bunun yanında öğrenciler bu mekanlarda sözlü iletişim uygulamaları yaparak sosyal becerilerini de geliştirmektedir. Yapılan çalışmayla Ankara'da bulunan Enerji Parkına gezi düzenlemek isteyen eğitimcilere kaynak teşkil etmesi için gezi sürecini planlama fırsatı sağlayacak bir taslak sunulmuştur. Hazırlanan taslak gibi diğer informal eğitim ortamlarına yönelik olarak yeni taslakların oluşturulması, bu yerlerin eğitim amaçlarına daha sağlıklı ulaşmasına yardımcı olacaktır.

Anahtar Sözcükler: İnformal Eğitim Çevreleri, Fen Öğretimi, Değerlendirme

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INTRODUCTION

In order to help the public more easily understand and appreciate new developments in science and technology, it is necessary to support formal education in schools with informal learning environments. Though formal education and informal education are interlocked and complement each other, they are educational areas with totally different features.

Informal education, which is composed of an individual's interaction with his environment and is not planned, scheduled or controlled, is sometimes more efficient than formal education in the process of behavior change and gaining new behaviors (Wellington, 1990). Research has suggested that diversifying and increasing the frequency of activities that children are interested in strongly affects the improvement of abilities they acquire at school (Gerber, Cavallo & Marek, 2001; Hannu, 1993).

The most important of these activities is visiting informal learning environments such as museums, science centers, zoos, botanic parks, forests, libraries, aquariums, and nature centers (Hannu, 1993).

Informal Learning Environments and Education Programs

Education programs which give students the opportunity to use their sense organs more and include various group activities provide great benefits for students in connection with gaining knowledge and experience. Because of this, educational programs should be planned by considering students' interests and needs, without neglecting the entertainment factor. In addition, appropriate educational strategies and activities should be used (Guisasola, Morentin and Zuza, 2005 & Lemelin and Bencze, 2004).

Another matter to be considered when education programs are being designed is the visitors' age levels and expectations. It will be very beneficial to prepare educational activities that attract them within the visitors' age levels and expectations, address all of their sense organs, arouse curiosity, and are appropriate for their understanding level.

In a museum education program, the following 3 basic factors are complementary and constitute the whole program (Yılmaz, 1996);

1. Objectives (Aims): These describe the qualities that can be acquired by the individual through education.

2. Teaching and learning activities (Educational activities): In order to ensure that the individual attains the objective, specific teaching techniques should be used and the educational activities should be conducted according to a plan. Attaining the objectives, which have been determined concerning museums, is possible only if the individual learns, in other words, if the individual has gained appropriate educational experiences. The individual can only acquire this kind of appropriate educational experience by interacting with people and factors other than people, which are included in an

environment which is arranged to ensure that individuals gain such experiences.

3. Evaluation: These procedures are applied on the completion of each educational activity in order to discover whether the pre-determined objectives have been attained. Evaluation is necessary for individuals to recognize the items / elements which they had not been able to learn or they have / had difficulty in learning, and to investigate the reasons for this and therefore ensure that the education proves more effective.

As is understood, science centers are no more places that people visit for only 10 or 15 minutes. They organize activities in accordance with goals as with formal education institutions and consider how efficient these activities are in reaching predetermined goals. However, it is observed that because typical school tours to science centers are generally organized in a short time and with the aim of entertainment, there is no tour plan or efficient evaluation after it and the desired goals cannot be reached.

In his study, Bozdoğan (2007) stated that visits to science and technology museums are mostly made through schools. However, most of the teachers who work in schools and participated in that study did prepare a program for the visit.

PURPOSE OF STUDY

This study aimed to show that there are several places like this in our country, even though their number is few; and to provide science educators with the necessary procedure to carry out an effective science center tour which can provide a resource for other teachers. In this context, the Energy Park in Ankara was taken as an example.

METHOD

Research Model: In the research, the document analysis method taken from qualitative research patterns was used. This method includes the analysis of written and visual (film, video, photographs, etc.) resources which contain information about the focus of the research (Yıldırım and Şimşek, 2006). In the study, written and visual documents necessary for a first time visit to the Energy Park were examined and a program of the visit was prepared to ensure that school visits to this park would attain their objectives.

Learning Environment: Energy Park, Ankara

The Energy Park, which presents energy sources and productive technologies to the younger generation, was opened means of coordination between the General Directorate for Electrical Works Research Administration (EİE) and Ministry of Energy and Natural Sources, in the garden of the General Directorate for Mine Exploration and Research on 29 October 2004.

In this park, established with the aim of helping form an "energy culture" by making visitors conscious of energy, providing them with knowledge about energy sources, the energy production and consumption processes of Turkey, and introducing the institutions connected to the Ministry of Energy and Natural Sources and private sector, there are examples of energy raw materials, energy producing systems from the past to today, and educational studies creating a consciousness about energy productivity and renewable energies.

The Energy Park, the first energy museum in Turkey, serves its visitors with 5 guides and 2 personnel. The park, visited by over 150,000 people up to June 2006, was established on a 5,000 square meter closed area in grounds totaling 10,000 square meters.

In the closed part of the park, a lot of information about renewable energy sources, fossil fuels, and mines is exhibited. In the open air exhibition area are exhibited a working miniature of Artvin- Borcka Dam, the original 42 meter high T-32 tower which was used in Batman petroleum wells between 1965 and 1997, a model of an 18 meter high and 12 meter diameter wind turbine with a production capacity of 20 kilowatts of energy per hour, miniatures of mines at Zonguldak and Tuncbilek and evacuation wagons, the original of the Horse Head face pump which is used commonly in petroleum production, and a Solar Source which presents solar energy for daily life.

In the Energy Park, there is also a library introducing the energy resources of our country, an exhibition of "Energy Usage At Home" which gives information about using energy productively and correctly at home, and a "Game area", in which the production and consumption of energy are explained by means of experiments.

RESULTS

Teachers generally think that museum tours are trips in which students see interesting things and enjoy themselves. But the most important thing to be considered is preventing students going on a tour without an aim. Research on long and repeated museum tours showed that these tours provide students with learning and deep understanding. In addition to this, it is observed that students gain information and social benefits from relating the school curriculum with activities in the museum and doing activities like they do at the museum in school (Rapp, 2005).

The tour should be well planned for student groups to learn about the museum's collection and love it. This planning is carried out in 3 steps: preparations before the tour, studies during the tour, and evaluation after the tour (Jarvis and Pell, 2005 & Bakan, 2003 & Ata, 2002 & Baker, 2002 & Rix and McSorley, 1999 & Kosebalaban, 1989). The required planning is elaborated within the scope of the Energy Park example and explained in Tables 1, 2 and 3.

Table 1: Work to be Completed before the Visit

Phases	Preparations	Preparations for Energy Park
Educational Preparation	• The teacher should visit the museum beforehand, obtain information from museum staff about the materials in the museum, and determine the student's needs before the museum visit. • The visit should be organized in conformity with the content of the course program, within this scope a plan about the museum in general or the points to be focused on should be prepared. That is, the teacher should correlate the materials in the museum with the subjects introduced in the course. • The purpose of the visit, the basic concepts and skills, to be used, should be determined. • The teacher should inform the students about why they are going to the museum, the kind of activities they will do there, which subjects of the course are related with this visit and how they should behave in the museum, in order to alleviate any concerns about the visit, to arouse their interest and realize appropriate learning. • Brochures or leaflets should be obtained from the museum, or simple information sheets can be prepared so that the students can understand. The brochures, leaflets or simple information sheets should include information which arouses the interest of the students and gives various questions for evaluation.	**Address:** MTA Yerleşkesi Yüzüncü Yıl Girişi (Tabiat Tarihi Müzesi Girişi) Ankara. **Communication:** +90 (312) 287 34 30 (27 27) There is appointment system in the Energy Park. You can make an appointment with the Energy Park for any day of the week through phone call, e-mail or web site. The park is open between $09:^{30}$ - $17:^{00}$. Groups coming from a school can visit the museum for a duration of 90 minutes. The leaflet (App-1) prepared concerning Energy Park should be distributed to the students and it should be ensured that the students have information about the Energy Park before the visit. Before the visit, the question form (App-2) prepared for students should be distributed and it should be ensured that they answer the questions properly.
Bureaucratic Procedures and Transportation	• The teacher should take the necessary legal permission from the parents of the students, school administration and authorities of the local administration and also should inform all parties about the visit. • The teacher should determine the route, duration, vehicles, time of departure, number of students, price and structure of the visit beforehand. • The museum to be visited should also be informed about the number of students, the date and time of the visit and an appointment should be made.	The visit plan concerning the visit to Energy Park should be prepared; the necessary permissions should be provided and the catering, transportation and accommodation needs of students should be met.
Catering and Accommodation	• If the museum is out of the city and arrival-return lasts more than one day, the necessary reservations for catering and accommodation should be made.	

Table 2: During- visit Activities

	in E.P.	in Energy Park	in Energy Park
Educational Works		• A sufficient number of guides should be provided by taking into consideration the need for guidance. The guides should inform the students about the exhibitions and activities during the visit and should help while the students are undertaking activities. However, they should not help with the answers to the questions that the students are required to find. The students should find the answers of their questions by exploring. • The guide should help the students acquire practical skills by ensuring that the students participate actively by touching and trying; they should teach the students the features, structure, working principles of the exhibitions or activities, and how these can be used in daily life. By asking a limited number of open-ended questions, the guide should ask the students to make observations, discuss and make inferences about the realities, which are based on the exhibits in the museum. Within this scope, by taking into consideration that the students' motivation can decline, various activities (search find, collection hunting, etc.), and games can be organized; puzzles and crosswords can be prepared. • The attitudes and orientation of the teachers and museum officers are particularly important in the improvement of student attitudes towards science, thus, they should approach students in a friendly manner and allocate some time during the visit for the students to walk freely within the scope of their interests. The creativity and interaction processes of the students, who are left unaccompanied to tour the exhibitions and participate in the activities, should be monitored. • Within the scope of the visit program, the teachers should be careful about not to place too much responsibility on the students during the visit. Since this may negatively affect their attitudes towards the exhibitions and activities, teachers should try to create opportunities for students to have fun and engage in social interaction during the visit.	In Energy Park, there are 2 personnel and 5 guides. The guides in the park work as full time guides and they are graduates or university students who are still studying. The students are divided into groups of 10 and continue their visit to other areas in the park accompanied by guides. The last 15 minutes of the visit is allocated for free walking in accordance with the interests and needs of the students. During this process the teachers, in cooperation with the guides, should observe and orient the students. Within this period, conception mistakes of the students should be determined. Moreover, the observation – question form (App-3) should be distributed to the students and should be completed by the students during their visit. Teachers should enable the students to fill them properly.

Table 3: Post visit Activities

Phases	Activities	Evaluation after Visit to Energy Park
Evaluation	• After the museum visit, an end-test can be administered to assess the students' knowledge about the technical terms and proper names concerning the objects and exhibitions in the museum, the working principles and their place in everyday life. • A discussion can be held in order to correct student's misunderstandings or wrong concepts in the class. Within the activities conducted in the museum, during the period allocated for discussion the critical thinking skills of the students can be improved. • Students can be asked to write essays and draw pictures including description and interpretation of the exhibitions and activities in the museum. • The photos taken in the museum can be displayed on the school notice boards and the students can watch various films and slides and prepare projects. • The families of the students should be informed about the activities connected to the visit, therefore facilitating the families' involvement in encouraging the students to participate and helping in increasing the student's interest in science. • By reviewing the visit, opinions can be elicited in order to develop more, and improved activities through the next academic year.	After the visit to Energy Park, the achievement test (App-4) can be administered. This test was prepared in order to determine the academic achievement of the students within the scope of the exhibitions in the park. In addition, the following activities can be given; the matching test (App-5), which helps student's reinforce the names of the exhibits in the Energy Park; drawing and essay writing (App-6-7) for describing and interpreting the exhibitions; and after the visit, detailed brainstorming (App-8) in the class environment about the subjects which were determined within the scope of park visit. This evaluation process can be extended to include project work (App-9) on the knowledge and skills they acquired during and after the visit.

RESULT AND DISCUSSION

Teachers have a significant responsibility in tours in all steps. In order to reach the goals of the tours, teachers must plan the tour process in detail. It was observed that pre-acknowledgement of students before the tour to science centers made exhibitions in the science centers more interesting; the success of students increased, and because of this it is helpful for students to be pre-acknowledged for qualified learning (Hannu, 1993; Holmes, 2003). In addition to this, it is emphasized that teachers should organize some activities after the tour in order to build students' knowledge from the tour. It is said that activities after a well planned tour not only help students to progress and strengthen the scientific concepts but also let new concepts come into being that are gained by students in the informal education center museum tour process (Anderson et al, 2000). When the literature is examined, it is

understood that teachers do not have a clear view on how to use informal education environments; they think tours are only for fun; they have difficulties in making preparations before the tour; and they do not attempt to relate the curriculum at school with the materials and activities in the museum (Tal, Bamberger & Morag, 2005; Kisiel, 2005; Bowker, 2004; Griffin & Symington, 1997). It is stated that this is because they cannot relate their tour plans with the curriculum, that teachers have different individual and professional information and skills; and that visitors have different interests and experiences (Kisiel, 2005). By considering these problems, a model is presented to reduce the workload of the educators who organize tours to Energy Park and give them the opportunity for better planning. Preparation of new models about informal education environments such as this model will help reach the aims of visiting these places.

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