

Educational Field Trips In High School Geology: Development – Implementation – Evaluation

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Abstract

The present study deals with the development, implementation, and evaluation of geological learning field trips for high school.

THE DEVELOPMENT:

Four one-day field trips were developed along the west-east cross section through the central part of Israel, from the Mediterranean to the Dead Sea. The field trips are:

- Two field trips on the coastal plain: "Poleg Beach" and "Judean Coastal Plain"
- From the foothills to the mountains
- From the mountains to the Rift Valley.

Each field trip was incorporated into the curriculum as a module which comprised (1) a preparatory unit, (2) a one-day field trip (3) a summary unit. This structure was based on didactic desirability such as: a gradual move from the concrete to the abstract, first-hand experiences and factors that influence learning ability in the field.

The development phase was subjected to three criteria: (1) administrative criterion (ease of organization) (2) curricular criterion (covering basic concepts by concrete activities) (3) educational criterion (the field trip should be a concrete learning event.)

The curriculum package, that was prepared for each field trip, included: a teacher's guide for the preparatory unit, a field trip booklet that directs the student's work at learning stations and a series of mini-posters to help the teachers to explain field observations.

THE IMPLEMENTATION:

The field trips are intended to serve two curricula: a) the course "Introduction to Geology", which is a part of the geology high school curriculum. b) the geology chapters of the geography high school curriculum. The implementation of the field trips was followed by two in-service training programs:

(1) a program for geography teachers that lasted 120 hours and focused on the following aspects:

- acquaintance with the learning-teaching materials
- the route of the field trips
- the technique of using the field trip as a teaching tool
- enrichment of the geological knowledge.

(2) a training program was conducted with a small group graduate geologist students. This program was shorter than the first one and covered the tutorial aspects only.

THE EVALUATION:

The research had two main goals: a) a formative evaluation of the field trip "From the Foothills to the Mountain". b) an investigation of the factors that influence students' learning abilities in the field.

The research population consisted of 300 high school students from the 9th, 10th, and 11th grades who participated in the field trip " From the Foothills to the Mountain."

The research structure included pre/post measurements of knowledge and attitudes and observations on the students during the field trip event.

The research tool included:

- 5 different questionnaires
- observation schedule
- teacher's report.

Three of the questionnaires were developed and validated as a part of the present research, namely: "Attitudes Towards Learning Field Trip", "Attitudes to Summarize the Field Trip Event", and the achievement test.

The main findings of this study are:

- 1) The field trip "From the Foothills to the Mountain" was found to be an effective, enjoyable learning tool.
- 2) Classes which strictly followed the didactic model, i.e. inserting the field trip in the early stage of learning and using the preparatory booklet, students demonstrated a statistically significant improvement in their knowledge and attitudes, compared to students from classes that followed the traditional approach, i.e. going to the field at the end of the course which was mainly based on frontal learning .
- 3) The phenomenon of "novelty space" was supported by the results of a multiple regression analysis. Three factors, from 22 that were measured, were found to be the most important factors that influence the learning ability of students in the field. These factors represent the three components of the

novelty space: the novelty of the concepts and skills used in the field trip, the psychological novelty of the event and the geographical novelty.

It is suggested that the didactic model and the research instruments that were developed in the present work, could be utilized successfully, for development and evaluation of field trips in other scientific disciplines.