



Biology Teachers' Views on the Importance and the Means of Incorporating Field Trips into the Curriculum

Yulia Ovtracht¹, Dina Tsybulsky²

Abstract

This paper deals with Israeli high-school biology teachers' views on the importance and the means of incorporating field trips into their curriculum. The research sample included 35 high-school biology teachers from different parts of Israel. Data collection instruments consisted of open-ended questionnaires and semi-structured interviews conducted with the teachers. The data were analyzed using a qualitative cognitive-thematic method. Correlations were calculated between teachers' demographic data (degree, seniority) and their description of the importance of field trips, the characteristics of a good field trip and the difficulties faced while planning and conducting field trips.

On the importance of field trips as part of the biology curriculum, three categories emerged from the teacher's answers: cognitive, emotional and values-oriented contribution. A negative correlation was found between the teachers' education and years of experience and the importance of using field trips to incorporate environmental values.

Teachers mentioned the following components as part of a good field trip: thorough preparation and summary in the classroom, interesting, and related to the biology curriculum. A negative correlation was found between the teachers' years of experience and the importance of the field trip and its relevance to the curriculum.

The teachers mentioned conducting field trip to ecological sites and science centers. A negative correlation was found between teachers' years of experience and conducting field trips to ecological sites.

The main difficulties with conducting field trips were financial, organizational, and the need to "cover all the topics in the curriculum". A negative correlation was found between the teachers' degree and the need to specify the exact number of field trips in the curriculum.

By addressing the biology teachers' views, needs, and the difficulties that they face, the frequency and efficiency of field trips can be increased, thereby increasing the role of field trips in the school biology curriculum and improving the teaching of biology. The factors included in the current study, such as combining cognitive and affective elements, preparation and summary, financial problems and other organizational constraints, are only some of the issues that need to be addressed in order to plan and execute a successful field trip.

Keywords: biology education, teachers' views, field trips

1. Introduction

It is commonly accepted that improving science education is one of the major challenges of educational systems worldwide. One way to improve science and biology education is by means of introducing field trips as part of the biology high-school curriculum [1,2,3]. All high-school biology students in Israel are required to participate in at least one ecology-based field trip [4]. The objectives for a field trip can be defined in different ways by students, teachers and by field-trip guides [5]. The most common justification given by teachers for conducting field trips is the possible connection with a subject included in the official curriculum [6]. Teachers value the opportunities afforded by field trips for positive affective and social experiences [7,8], and for cognitive learning outcomes [9]. Consequently, the associated with a field trip is no considered merely an extension or enhancement of the classroom experience; rather, it is now perceived to be a valuable syllabus component in-and-of itself, as well as an excellent way to prepare students for future learning [10,11]. There are different factors that influence the frequency of conducting field trips: logistic constraints, financial limitations, lack of time, insufficient support from the school management, rigidity of the school curriculum and disruptive behavior of the students [12]. In order to increase the frequency and the quality of biology field trips, the biology teachers' views must be examined and taken into account. This research examines biology teachers' views of different aspects of incorporating field trips into formal high-school biology teaching.

¹ The Hebrew University of Jerusalem, Israel

² Tel Aviv University and Achva Academic College, Israel



2. Methods

The research question was: What are the high-school biology teachers' views of different aspects of incorporating field trips into formal biology teaching? For this purpose, we constructed a questionnaire of 10 open-ended questions, each addressing a different aspect of incorporating field trips into the formal biology curriculum. Additionally, we conducted semi-structured interviews with the teachers. The research sample included 35 high-school biology teachers from different parts of Israel.

The answers were analyzed using quantitative and qualitative methods. For each possible reply, a frequency of appearance was calculated and Pearson's correlation analysis was performed, in order to find possible connections between demographic data (degree, years of experience) and the teachers' replies. The replies were also analyzed using Shkedi's cognitive-thematic method of qualitative research, based on grounded theory [13]. All replies were divided into different groups and subgroups. A 90% inter-rater reliability was found between the two coders of the study.

3. Results and Discussion

The questionnaires and semi-structured interviews examined various aspects of incorporating field trips in the biology curriculum. We first tried to establish **the importance of field trips as part of the biology curriculum**. All teachers' answers (from the interviews and on the questionnaires) included reference to the cognitive, emotional, and values-oriented significance of field trips. A description of each of these categories follows.

- (1) Cognitive advantages included a different perspective of the curriculum (20%). Teachers described the field trip as helping students gain a broader understanding of biology, in contrast to the partial view afforded in the classroom setting. Thus, for example, Kineret noticed: "It is important to include variety in the teaching process; in a subject such as biology, the students must go outside and get to know nature in all its complexity". Another cognitive advantage the teachers listed was getting acquainted with new natural phenomena (12%). This statement follows the logic that we cannot teach biology without experiencing first-hand the natural phenomena that are being discussed in the classroom: "We need to get outside and get to know the organisms and natural conditions that influence them" [Nitzan]. An additional cognitive advantage of field trips mentioned was exposure to novel scientific knowledge that is not part of the day-to-day biology syllabus, which they considered a more significant way to teach biology (9%). "Students are being exposed to research labs and novel research fields that are beyond the perimeters of the classroom and school" [Naomi]. These findings support previous studies regarding cognitive advantages reported, for example in the study of Storksdieck, Robbins, & Kreisman [9].

A negative correlation was found between the teachers' academic degree (B.A, M.A, or Ph.D.) and the role of the field trip as a way to expose students to new biological phenomenon. The more educated teachers did not mention those factors as the reasons to incorporate field trips in the curriculum. One explanation for this finding might be that the more educated teachers are able to incorporate scientific phenomena in the routine lessons as part of their broader scientific view.

- (2) The emotional advantages of field trips included the need of the field trip to be "fun" and a way to increase motivation to study biology (42%). For example, Yael noted: "The way we teach biology in the classroom is irrelevant to more than 50% of the students [due to different learning styles—author's addition]; we need to give them different opportunities to learn". The affective advantages were also previously reported in various studies [9,14]. No significant correlations were found in this category.
- (3) Value-oriented advantages of field trips include the opportunity for students to become familiar with current nature-conservation issues in a more concrete way than it is addressed in the classroom (15%). "The field trip is a way to bring current topics into the classroom" [Rakefet]. A negative correlation was found between the advantage of addressing environmental issues and the teachers' years of experience. The more experienced teachers did not list this advantage as a major factor in the decision-making process regarding the inclusion of field trips in the syllabus. This finding might be explained by suggesting that the more experienced teachers are able to include those values during the routine biology lessons. This finding is unique to this study and was not reported beforehand.



Regarding **the characteristics of a good field trip**, the teachers mentioned components such as being interesting and enjoyable (24%): “The field trips can cause students to enjoy the subject” [Yael]. Another important feature is the inclusion of a thorough preparation stage as well as a summary stage, conducted in the classroom (18%): “Early preparation and a post-field-trip assignment are a must in every field trip” [Etty]. A well-organized trip has an additional required element that the teachers mentioned (15%): “A good field trip includes a good distribution of time, relevant activities, and well planned logistics” [Nava]. Another aspect of preparing and executing a worthwhile field trip that was mentioned in teachers’ responses (12%) was defining the goal of the activity: “A field trip must have a clear and well-defined goal” [Lina]. Finally, the teachers mentioned that the field trip must be related to the biology curriculum (12%): “The students must understand the science behind the field trip, which was taught in the classroom prior to the field trip” [Rakefet]. Teachers’ awareness of the significance of connecting field trips with the curriculum has been reported in previous studies (see for example [6]).

A negative correlation was found between teachers’ years of experience and the feature of relevance to the curriculum. The more experienced teachers were less concerned with the relevance to the curriculum. Perhaps the more experienced teachers are able to broaden the students’ horizons by conducting field trips on subjects that are not strictly part of the curriculum.

We attempted to map the current locations that are popular as biology field-trip sites in Israel. The sites the teachers mentioned can be divided into two subgroups: ecological sites (30%) and science centers (70%). For example, teachers mentioned forests and seashores as possible ecological field-trip destinations. Regarding science centers, teachers mentioned such sites as research hospitals, teaching laboratories in institutes of higher education, etc.

A negative correlation was found between the years of experience and conducting field trips in ecological settings. The more experienced teachers tended to conduct field trips to sites other than ecological settings. This finding might be explained by the familiarity of the more experienced teachers with science centers or the need to extend their repertoire by including more complex settings. It also suggests some dissatisfaction with the current popularly used sites, and an interest in changing to a more academic site.

The teachers were asked to list **the main difficulties they typically face while planning and conducting field trips**. The main difficulties were financial (53%): “We usually don’t have money even for transportation” [Kineret]. Organizational challenges were also mentioned (21%): “We mainly face technical problems with conducting field trips” [Nitzan]. The need to cover all the topics in the biology high-school curriculum was another challenge the teachers mentioned (15%): “We are concerned with wasting teaching hours” [Yael]. The difficulties raised by the teachers closely parallel those described in previous studies [12].

The various difficulties can be viewed as related either to the individual teacher’s perceived impediments or obstacles related to the school system and the organizational framework. The majority of the factors mentioned were related to the school. This means that when planning a field trip, the more general factors, such as the financial expense need to be, before we can address individual teachers’ needs and agendas.

A negative correlation was found between the teachers’ level of education and the complaint that the curriculum does not specify the number of field trips required. The more educated teachers were less concerned by the lack of a predefined requirement regarding the inclusion of field trips in the curriculum. This issue can be classified as either an organizational or a personal challenge. One explanation for this finding might be the fact that the more educated teachers tend to set their own agenda, because of their broader scientific-educational perspective.

4. Conclusions

By addressing the biology teachers’ views, needs, and the difficulties that they encounter, the frequency and efficiency of field trips can be increased, thereby increasing the role of field trips in the school biology curriculum and improving the teaching of biology. The factors included in the current study, such as combining cognitive and affective elements, preparation and summary, financial problems, and other organizational constraints, are only part of the issues that need to be addressed in order to plan and execute a successful field trip.



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