



Training Impact upon Teachers Field Trips Projects – A Preliminary Evaluation

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Abstract

School visits to museums and science centres are considered a powerful learning resource when carefully planned and integrated into classroom activities. Well-designed visits imply a set of activities linked with the students' curriculum and occurring during the visit as well as before and after. Pre- and post-visit occurrences are typically developed in the classroom. However, the literature has shown most teachers do not prepare for field trips, do not define the visit purpose and do not relate the school curriculum with museum's exhibits. In this work, we examined ten field trip projects developed by in-service teachers' participating in a training course where science education practical activities in formal, non-formal and informal contexts were explored. In particular, guidelines for selecting, planning, conducting, and evaluating field trips were provided. This qualitative descriptive-oriented study aimed to evaluate: (i) field trip projects developed by in-service teachers' before and after the training course, (ii) teacher's didactic proposals to be developed with students before and after the training course. Results indicate that the teacher-training course contributed positively to the professional development of the in-service teachers with regard to their preparation of field trips to museums and science centres. Furthermore, teachers recognised the importance of planning pre- and post-visit activities to optimize students' learning. This study contributes to improve future teacher training courses related to effective planning of field trips to museums and science centres.

Keywords: *Science Education; formal and non-formal educational contexts; field trips; teacher training.*

1. Introduction

The articulation of formal, non-formal and informal education contexts is an increasingly frequent recommendation in international science education guidelines. Personal and social experiences outside the school environment are understood as an important part of student training [1, 2]. Non-formal education spaces such as science centers and museums may promote scientific education while providing a better understanding of science and its relationship with Technology, Society and Environment [3].

In Portugal the number of science centers and science related exhibitions increased significantly in recent years and school age children are a considerable proportion of visitors [4].

There is a consensus concerning the field trips importance and the need to integrate them with the school curriculum and into the classroom [5]. The literature suggests teachers are inadequately prepared to plan, supervise and evaluate field trips to non-formal educational spaces, especially regarding pre- and post-visit activities [6, 7].

Thus, it is crucial to incorporate these recommendations in the design of teacher training programs [5, 8]. This article evaluates the impact of such a program designed to assist primary school teachers to prepare field trips to non-formal education spaces.

2. Teacher Training Course Programme

The course "Pre, during and post-visit field trip activities" was a one-day workshop attended by teachers from the 2nd and 3rd levels of Basic Education, hereafter referred as trainees.

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The work proposed entailed: a) planning a field trip in different science education informal and non-formal contexts, including pre, during and post visit moments; b) visiting a local informal and non-formal education site as a starting point to explore planning aspects; c) exploring possible classroom practical/laboratory activities related to field trips; d) reflecting on the educational potential of this type of activities.

3. Methodological Procedures Adopted

In this qualitative-descriptive case study [9] trainees visit plans and didactic proposals developed before and after the course were analysed. Trainees had to: a) select a place to visit and justify the choice made; b) plan a visit describing pre, during and post-visit moments. The plans and didactic proposals were evaluated using the instrument "Quality levels - science activities in a non-formal context (field trips)" [10]. The scale of 1 to 5 (1 – insufficient; 2 – regular; 3 – good; 4 – very good; 5 – excellent) analyses the main aspects to be taken into consideration while preparing a field trip (Table 1).

Table 1. Research instrument "Study visit" [11]

| Study visit | |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pre-Visit | |
| Teacher preparation | Definition of the intention / purpose of the visit (stimulate or motivate; introduce a topic; revise and consolidate) |
| | Collection and organization of information documents about the visit |
| | Visit to the site |
| | Planning of the visit (definition of the duration of the visit, research on the themes, selection of activities and modules, decision on the route(s) to follow...) |
| Pupils preparation | Contextualization of the study visit by addressing the themes studied or to be studied |
| | Providing basic information on the site |
| | Engaging pupils in the preparation of the visit (research on the themes and on the place to visit, elaboration of the visit guidelines...) |
| | Identification of pupils' preconceived ideas on the contents/phenomena to be explored during the visit |
| | Definition of the visit's learning outcomes |
| | Writing a list of questions to be asked during the visit, taking into account the learning outcomes on the theme(s) concerned |
| Deciding and organizing registration procedures to be applied during the visit | |
| During visit | |
| Beginning of the visit — guiding the pupils | |
| Exploration of activities /modules | Conducting the visit, teacher's and monitor's roles |
| | Implementation of the planned activities (e.g. exploration of modules, observation of animals or plants, conducting experiments...) |
| | Looking for answers to the questions raised in the classroom |
| | Data collection and registration (photographs, films, audio records, worksheets, notes on the exploration of modules, conclusions, doubts...) |
| End of the visit — guiding the pupils in the time they have left | |
| Post-visit | |
| Reflection on the study visit (what they learned, what they liked most, what they did not like, doubts...) | |
| Organisation of the information and elaboration of posters, group reports... | |
| Presentation of the assignments about the study visit (peers, educational community...) | |
| Relate what they saw and did to the approaches implemented or to be implemented in subsequent classes | |
| Planning of small projects, activities or experiences based on the study visit | |

To evaluate, for example, the item "Definition of the intention..." the following criteria was followed. A non-definition of the visit purpose corresponds to level 1 (insufficient) while a clear, objective and rigorous contextualized definition of the visit purpose taking into account the expect learning to be achieved and children expectations equates to level 5 (excellent).

Content analysis technique was applied to the data [12].



4. Data analysis and presentation of results

Fifteen participants attended the course. Five failed to complete all the evaluation phases. Thus, this study includes 10 trainees (later identified as TT1, ..., TT10) with initial training in Biology and Geology (3 teachers), Mathematics and Natural Sciences (2 teachers), Physics and Chemistry (2 teachers) and Biology (3 teachers).

4.1 Evaluation of teacher-trainees practices (before and after the course)

With regard to the three fundamental moments considered pre-, during and post-visit, the analysis of the detailed plans and didactic proposals shows that trainee's performance either stayed the same or improved after the course. It should be noted that in the visit preparation of pre- and post-visit moments all trainees increased their score. While two trainees maintained their during-visit moment results and eight improved them (Table 2).

Table 2. Comparison of before and after the training program – Quality level

| In-service teachers | Pre-visit | | | During | | | Post-visit | | |
|---------------------|--------------|-------------|-----------------|--------------|-------------|-----------------|--------------|-------------|-----------------|
| | Level before | Level after | Level variation | Level before | Level after | Level variation | Level before | Level after | Level variation |
| TT1 | 2 | 4 | ↑ 2 | 1 | 3 | ↑ 2 | 1 | 3 | ↑ 2 |
| TT2 | 2 | 3 | ↑ 1 | 1 | 2 | ↑ 1 | 2 | 3 | ↑ 1 |
| TT3 | 1 | 2 | ↑ 1 | 1 | 2 | ↑ 1 | 1 | 3 | ↑ 2 |
| TT4 | 2 | 4 | ↑ 2 | 1 | 5 | ↑ 4 | 2 | 4 | ↑ 2 |
| TT5 | 1 | 2 | ↑ 1 | 1 | 2 | ↑ 1 | 1 | 2 | ↑ 1 |
| TT6 | 1 | 2 | ↑ 1 | 1 | 1 | = | 1 | 2 | ↑ 1 |
| TT7 | 1 | 3 | ↑ 2 | 1 | 2 | ↑ 1 | 1 | 3 | ↑ 2 |
| TT8 | 2 | 3 | ↑ 1 | 1 | 3 | ↑ 2 | 1 | 3 | ↑ 2 |
| TT9 | 2 | 4 | ↑ 2 | 3 | 3 | = | 2 | 3 | ↑ 1 |
| TT10 | 2 | 5 | ↑ 3 | 1 | 3 | ↑ 2 | 1 | 4 | ↑ 3 |

The analysis of before course plans reveals trainees mainly concerned with logistics and organization aspects as shown by the following quote: *"Firstly contact location staff to schedule a likely date for the field trip. Then enquiry the school direction if money is available to carry out the field trip"* (TT3). After the course trainees were more attentive to the importance of being familiar with the place before the student visit, as show by the excerpt: *"As preparation a trip (real/virtual) would be made to the Museum in order to decide which spaces to visit, modules to be explored, use time efficiently and adjust the length of the visit"* (TT4). Still trainees failed to define field trip objectives and learning outcomes.

The during-visit was the least referred moment by trainees. This may be related to the fact that no actual planning was implemented or because during-visit activities were ascribed to site monitors. Trainees assumed their role to be to control students' behaviour and attitudes.

Amongst the three key preparation moments, the post-visit showed the greatest trainee evolution. They presented more elaborate descriptions, mentioned follow-up activities and school projects, as illustrated by the next quote: *"Students and teachers should reflect on the field trip, discuss its strengths and weaknesses and what changes they would make. In addition, it is important that they work on what they have learned and communicate it to the rest of the class and educational community"* (TT6). In addition, all trainees intended to promote a field trip reflection to evaluate student learning, what they most and least liked, doubts that arose, etc.

4.2 Trainees course assessment

Evaluating the course trainees pointed out training allow them: a) to reflect on the teacher role and student involvement in field trips; b) to experience activities of articulation between formal, non-formal and informal educational contexts; c) to reflect on pedagogical methodologies and practices. Trainees valued the fact that a field trip was included in the course. Trainees considered course methods and contents adequate.

5. Conclusions

Results indicate the course contributed to teachers' professional development. It is important to draw attention to the lack of continuous and initial training courses on this subject, a fact mentioned by



many trainees. Offering more courses of this nature may contribute to improve teachers' practices with regarding the integration of formal, non-formal and informal sciences education contexts.

Trainees recognized the importance of a prior field trip planning and considered selecting activities for the pre, during and post-visit moments as a necessary resource to increase the visit impact. However, we realised that trainees paid more attention to the pre-visit moment. A result in line with previous research carried out in the field, which indicates that teachers tend to be more concerned with instructional or organizational strategies prior to visits, such as scheduling, transportation and eating guidelines [13].

In our opinion investigations to better support teachers to use field trips as a science teaching resource should consider strategies teachers are already likely to apply [13]. In this sense, it is important to highlight the need to develop a more in-depth study of teacher's practices during field trips so that more effective learning experiences may be proposed.

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