Improving pre-service ECE teacher education in planning field trips for Science and Environmental Education from their learning output

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ABSTRACT
Some studies indicate that pre-service early childhood education (ECE) teachers have difficulties to plan field trips for science and environmental education. This study aims to describe the field trips planned by 139 pre-service ECE teachers at a Spanish university to identify transferable insights to improve their education. The qualitative methodology analyses the participants' proposals. The results reveal pre-trip activities mostly centred on the teacher, during-trip activities with a minimal emphasis on science learning, and post-trip activities highlighting artistic expressions. The discussion addresses transferable insights and a more complex view of planning.

KEYWORDS
Early Childhood Education, Environmental Education, field trips, teacher education, Science Education

RÉSUMÉ
Certaines études indiquent que les enseignants en éducation préscolaire (ECE) ont des difficultés à organiser des sorties scolaires pour les sciences et l'éducation à l'environnement. Cette étude vise à décrire les sorties de terrain prévues par 139 futurs enseignants en ECE dans une université espagnole afin d'identifier des connaissances transférables pour améliorer leur formation. La méthodologie qualitative analyse les propositions des participants. Les résultats révèlent que les activités pré-voyage sont principalement centrées sur l'enseignant, des activités pendant le voyage avec un accent minimal sur l'apprentissage des sciences, et des activités post-voyage mettant en avant les expressions artistiques. La discussion aborde des insights transférables et une vision plus complexe de la planification.

MOTS CLÉS
Éducation de la petite enfance, éducation environnementale, sorties scolaires, formation des enseignants, éducation scientifique

INTRODUCTION

Early childhood education (ECE) programs need to qualify pre-service teachers' education in planning field trips for science and environmental education. This need emerges since the literature reports problems in ECE teacher performance. Specifically, some studies reveal that pre-service teachers frequently plan field trips centred in teacher expository interventions

(Bravo et al., 2022), with little opportunity for science learning (Klaar & Öhman, 2014) or from a simplistic view of science (Toma et al., 2017). Thus, pre-service teachers will miss the opportunity to enhance ECE students' cognitive, linguistic, socio-emotional and motor skills (Karaca et al., 2016; Yıldırım & Özyılmaz Akamca, 2017) and science learning (Behrendt & Franklin, 2014). However, an alternative to improve ECE programs is to study pre-service teachers' learning to obtain evidence-based insights. Hence, the research question is: What transferable insights, to improve pre-service ECE teacher education regarding field trips for science and environmental education, emerge from pre-service teachers' learning output? Consequently, this study aims to describe the field trips planned (learning output) by pre-service ECE teachers at a Spanish university to identify opportunities to improve their education in planning.

This research contributes to the general fields of teacher education, science teacher education and ECE teacher education. First, the study involves pre-service ECE teachers at a university belonging to the European Higher Education Area (EHEA). Thus, the 49 countries in the EHEA obtain information to better understand pre- and in-service ECE teacher learning and possibility of mobility to guide regional policymaking. In addition, this study is a tool for pre- and in-service ECE teachers to enhance their knowledge of planning field trips for science and environmental education. However, educators, educational faculties, school trustees and policymakers might use this paper to identify gaps in the field, understand more teachers' learning and guide research, educational programs and policies to enhance ECE teachers' education.

REVIEW OF LITERATURE ON FIELD TRIPS IN ECE

Literature on field trips in early childhood education (ECE) is very scarce despite the vast production about field trips in primary, secondary, high school, and higher education. The specialised journals on ECE provide a few papers. Likewise, the available articles focus on learning about the natural environment, emotions, motor skills, curiosity and creativity rather than learning science. There is also a predominance of articles on studies in Finland and Sweden. This specific specialised scientific production scarcity is another relevant justification for spreading the present study on this unexplored topic.

There are very few specific results in the Asia-Pacific Journal of Research in Early Childhood Education, Childhood Education, Early Childhood Education Journal, European Early Childhood Education Research Journal, International Journal of Early Childhood Special Education, Journal of Childhood, Education and Society, Journal of Early Childhood Teacher Education, Journal of Research in Childhood Education, South African Journal of Childhood Education, and Topics in Early Childhood Special Education. The search included the expression "field trip" or "fieldtrip" between 2010 and 2023 and excluded reports on the primary school. As a result, no articles use the keyword in their title. Likewise, the summaries demonstrate that the authors do not directly address the topic of interest. The topics closest to the objective are physical education and children's daily outdoor play, which are not part of the corpus to review because they describe activities that happen almost every day. The search also used the expression "excursion"; the results were similar to the previously mentioned.

Within the four articles chosen in the search, Mawson (2014) describes how teachers' beliefs and pedagogical choices influence children's experiences in the natural environment. Two other articles focus on using outdoor experiences as a teacher training method. Thus, Niklasson and Sandberg (2012) involved pre-service ECE teachers in an actual field experience with children, and their job was to document the children's learning process. In this same sense, Torquati and Ernst (2013) recommend that ECE teacher training programs

engage pre-service teachers in real, structured and unstructured outdoor experiences with children. Finally, O'Sullivan's (2018) review concludes that despite public educational policies supporting outdoor learning, teachers still struggle with the insecurity that taking children outside could represent.

As the article corpus was so small, a new search used the keyword "outdoor" in ECEs between 2010 and 2023. The papers mainly address outdoor play and its risks. In other cases, the word outdoor delivered articles about garden or forest schools, mainly in Finland and Sweden. Some articles offer a very short or unclear summary, and their titles are not explicit, so it was impossible to determine their possible contribution. Therefore, they are not part of the new corpus to review.

Within the nine selected papers, a group describes children's learning in terms of a) how they relate to the world created by humanity and the natural context (Melhuus, 2012), b) the learning possibilities that the place of outdoor play offers to children (Canning, 2010; Niklasson & Sandberg, 2010), c) the pedagogy chosen by teachers or the educational system (Klaar & Öhman, 2014; Waller, 2010), d) the interactions between children and teachers (Waters & Bateman, 2015), and e) the type of learning that children and teachers achieve in the outdoor experience (Tan & Yang, 2022). Meanwhile, another set of papers focuses on proposing or developing teaching strategies for outdoor experiences. For example, Muela et al. (2019) describe qualifying outdoor experiences, including children's, parents' and teachers' opinions. Likewise, Friedman et al. (2023) propose principles to better attend to students with autism in outside experiences.

Consequently, the review confirms some gaps: a) the literature on fieldtrips in ECE is very scarce, b) the few papers on fieldtrips in ECE do not address science learning, and c) the literature does not report directly on the EC teacher education. Therefore, the contribution of this paper relays on reporting a study on fieldtrips for science learning planned by pre-service ECE teachers.

THEORETICAL FRAMEWORK: FIELD TRIPS OR SCHOOL EXCURSIONS

A field trip, excursion, visit, trip, tour or educational outing is a part of the teaching and learning process that occurs primarily outside the educational institution's doors. Teachers mainly plan the field trips, connect them to the curricular contents, delimit them in time and scope and sometimes articulate them with other indoor activities or strategies. Likewise, the field trip implies that teachers and students move, transport or travel to settings other than the classroom. Some of these scenarios could be parks, forests, museums, zoos, farms, scientific centres, factories, purification plants, orchards or gardens, and market squares. Most field trips have a guide or a demarcated route.

Behrendt and Franklin (2014) review the literature to propose planning and enacting field trips in three moments:

Prior to the field trip, a) the teacher should visit the venue to determine the place suitability for all students, b) the students should receive orientation regarding the place, rules, expected behaviour and conceptual foundation, and c) the teacher should connect students' previous experiences and learned concepts with the trip.

During the field trip, teachers, a) might attend to students' possible needs to participate in the visit, b) collaborate with the venue's staff to guide students in connecting their previous learnings and experiences with the new information, and c) keep the students engaged by using worksheets or other focusing ways.

After the field trip, students need to, a) reinforce or solidify learnings, b) clarify confusions or answer questions, and c) identify connections between the trip and new classroom contents.

Lee et al., (2020) carried out a large-scale study that demonstrated that field trips in the frame of pre-, during, and post-trip activities meaningfully impact student outcomes in environmental education.

METHODOLOGY

To answer the question – What transferable insights, to improve pre-service ECE teacher education regarding field trips for science and environmental education, emerge from pre-service teachers' learning output? this qualitative study describes the kind and frequency of activities proposed by pre-service ECE teachers when planning a field trip for science and environmental education. Likewise, the content analysis (Hsieh & Shannon, 2005) is the method to study the text belonging to the participants planned field trip.

Population, source of information and data

The population is 165 students who participated in the subject "Didactics of the Natural Environment and Environmental Education" at an online Spanish university. Students participate in several subjects in which they learn to plan teaching and learning according to current regulations. In addition, they acquire specific knowledge about planning, teaching, learning and assessing science and the natural environment in the mentioned subject. Another relevant characteristic is that most participants begin their university careers after having a technical degree in ECE and have worked as assistants in educational centres for a few years. For this reason, most participants already have experience planning and working with infants. The final sample consists of 139 students who submitted the field trip plan. Race, gender, age, nationality and other identities are not analysis categories in this study.

The source of information is the anonymised electronic files in which the students presented the planning of a field trip. Each file contains information about a) title and place to visit, b) context, c) learning objectives (according to the current policy), d) contents (according to the current policy), e) materials and resources, f) activities prior to the field trip, g) activities during the field trip, h) activities after the field trip, and i) learning assessment criteria (according to the current policy) and instruments, before, during and after the field trip.

The data emerge from the text sections explicitly titled "activity" and involve direct work with the children. The other aspects, such as objectives, contents and assessment criteria, respond to the current educational policy and are not data in this study.

Analysis process

The content analysis consists of two steps. The first step consists in grouping the activities according to the moment of the process: a) pre-trip, b) during-trip and c) post-trip, according to the theoretical framework. The second step consists of identifying the kind and objective of the activities classified under every moment to identify patterns. The patterns identification produces subgroups. The results display the subgroups of activities, their frequencies, limitations and exceptions.

RESULTS

This study aims to describe the field trips planned by pre-service ECE teachers at a Spanish university and propose alternatives to improve their education. Thus, this section describes the field trips by classifying the places and activities proposed by the participants. The discussion offers alternatives to improve the pre-service EC teacher education regarding field trips for science and environmental education.

Choice of place to visit

The places to visit depend on the context, whether due to economics, logistics, environment or availability. Within the 139 proposals, the most common places are: farms (farm, farm-school or productive farm) and parks (national, natural or urban), as Table 1 presents.

TABLE 1
Places to visit

Type of place	Frequency	%
Farm	50	36
Park	22	16
Museum	10	7
Water-centric environments	9	6
Forest or field	8	6
Animal shelter	5	4
Botanical Garden	5	4
Field establishment (houses and others)	4	3
Environmental education centres	4	3
Mountain	4	3
Others (i.e., market and water purification centre)	4	3
Vegetable patch	3	2
Planetary	3	2
Natural reserve	3	2
Beekeeping	2	1
Vineyards	2	1
Zoo	1	1

Source: own elaboration

However, teachers need to consider other possible places in urban settings as recycling centres, market squares, urban parks, water purification centres and zoos.

On the other hand, there are very few cases in which the proposals included a field trip within a project's framework, the students' diversities or other communities. Six of those cases declare that the field trip will be part of an existing project at the educational centre. However, the connection or place of the field trip in the project sometimes needs to be clarified. On the other hand, only one proposal considers a student's culture and another, a student's special needs. Furthermore, in one case, the proposal explicitly involves children from a foundation; in another, students would interview a farmer from the region.

Pre-trip activities

A total of 122 of the 139 plans proposed pre-trip activities, which encompasses 352 activities in total. Moreover, the participants proposed 2.9 activities on average. On the other hand, grouping the 352 activities according to their modality produced 21 types of pre-trip activities, as Table 2 details.

TABLE 2

Type and frequency of pre-trip activities

Type of pre-trip activities	Frequency	%
Artistic experiences	52	15
Asking questions	50	14
Teacher intervention	40	11
Video	36	10
Informative sheets, illustrations, photos or images	35	10
Talk	33	9
Experiences	20	6
Stories listening	17	5
Game	12	3
Learning corner	9	3
Objects identification	8	2
Brainstorming	7	2
Other types	7	2
Audio	7	2
Objects classification	6	2
Reading	5	1
Consultation on topics	4	1
Garden	2	1
Previous ideas assessment	2	1

Source: own elaboration

Activities related to artistic expression are the most common proposals in the planning of the pre-service ECE teachers. It is widespread to sing songs, draw or make murals associated with the theme of the field trip. Likewise, asking questions is a prevalent type of activity before the field trip. The teachers ask the questions to the students in assembly and are generally related to the topic or place to visit. Within the 50 cases of questioning as an activity, only one is for working in a group and one for working individually and considering the student's special needs.

Another group of frequent activities is those focused or directed by teachers. First, the activities in which the teacher intervenes are generally to explain the field trip or the associated content to the students. Second, the activities named "talking", in which the teacher tells the children about the field trip, logistics and rules or addresses related topics as a collective dialogue (in an assembly). On only one occasion, the pre-service teacher explicitly proposed a "talk" to guide students in reflecting on pollution.

The pre-service ECE teachers in the sample also proposed several more clearly student-centred activities. For example, all audio-visual activities are: a) video, mainly to learn about the content or site to visit, b) cards, illustrations, photos or images mainly of animals and plants, with information or to match c) listening to stories, often accompanied by questions, drawing or painting, and d) audios of animals students will see during the visit. The exceptions in this category are: a) on one occasion, the teacher shows the children a video to learn a song of gratitude to the people in the garden, b) on another occasion, the story is interactive, and c) on one occasion case, the audio about animals is followed by an explicit reflection on the relationship between humanity and animals.

Other activities focused on infants are a) experiences, which are as varied as trying the food, making things, interacting and doing experiments, b) games, mainly electronic on a tablet or blackboard, as a method to conceptualise or assess learning, c) the learning corner, especially to work on the theme of the farm, d) identification of objects related to the field

trip, e) brainstorming on the topic related to the field trip, f) classifying animals and planets, g) reading stories, or about the contents or the field trip, h) consultations on topics, i) visit the garden, and j) explicit identification of the student's previous ideas.

Finally, a group of activities is out of classification. Among them, one is exceptional because it proposes guiding children to identify what they know and do not know regarding the contents and field trips.

During-trip activities

A total of 135 of the 139 plans proposed during-trip activities, which encompasses 395 activities in total. Likewise, the participants proposed 2.9 activities on average. Subsequently, grouping the 395 activities according to their modality produced 15 types of during-trip activities, as Table 3 displays.

It is essential to mention that in several cases, the activity formulated is "tour", "guided tour", "visit", or "observation", which belongs to a single activity. For this reason, when, in addition to "visit", the proposal makes explicit other processes such as "interaction with animals" and "collection of information", among others, it is counted as two, three, or more activities.

TABLE 3

Type and frequency of during-trip activities

Type of during-trip activities	Frequency	%
Tour, visit, sightsee, walk, explore +	119	30
Workshop	45	11
Game	41	10
Interact with animals	34	9
Observing, seeing, identifying elements, animals, etc.	33	8
Gathering elements	25	6
Assembly	21	5
Artistic expressions	20	5
Looking for something	18	5
Guided tour as the only activity	12	3
Asking questions	9	2
The senses	7	2
Video	5	1
Including other people	4	1
Learning corner	2	1

Source: own elaboration

The most frequently planned activity by the participants has different denominations: touring, visiting, sightseeing, walking or exploring the chosen place. Teachers enriched this activity with other activities mentioned in the other categories. Likewise, this activity is carried out following guides, marked routes or freely, sometimes using a story or map as a guide, and in one case, using augmented reality. The visit would be done on foot, by bus, car or boat. Only on six of 119 occasions the plan is to engage students in recording what they see during the visit.

The participants call the workshop another set of activities. The workshop is a hands-on task with the intention of learning. Some workshop examples are food preparation, tasting or handling in the visited place; craft to build things, models or objects related to the visited place; and participation or work in the garden or crops.

The game is another category of activities during the field trip identified in the plans. The game is mainly free and at the end of the tour. In other cases, it is a role-play, the modality of the tour, or the mechanism to collect elements related to what they saw (fallen leaves and others). In a single proposal, the game is online.

Since the most common place to visit is farms, interaction with animals is another frequent type of proposed activity. Sometimes, it is just about petting the animals, other times feeding them and, more rarely, playing with them. Similarly, observing, seeing or identifying animals, vegetation, or processes is another category of activities to do during the visit.

Collecting leaves, fruits, garbage, and other fallen materials is another type of activity that the participants plan during the field trip. In the same proportion, participants plan to hold assemblies or student meetings at the place to visit to talk about the experience, assess learning, reflect on what they have learned, or explain topics or norms. Those assemblies happen as an introduction, during or after the tour. Likewise, the preservice teachers planned for students to engage in artistic expression during the visit, such as drawing what they are seeing or using songs or stories as a guide or conclusion to the visit. Likewise, looking for clues, objects, or characters is another type of planned activity during the field trip. Only one case explicitly proposes that students systematically record what they saw on the tour.

On the other hand, less frequently, the participants planned to ask the students questions during the tour or afterwards but in the same place. Likewise, other activities during the visit stimulate students to recognise objects or places through their different senses. In this same low proportion, the participants planned to watch introductory videos at the same venue on the tour. On very few occasions, participants consider interactions between students and other people, such as those caring for animals, farmers, or like family, through interviews or projects. Finally, on two occasions, the teachers mentioned using the learning corner as part of the visit.

Post-trip activities

A total of 118 of the 139 plans proposed post-trip activities, which involves 236 activities in total. Furthermore, the participants proposed 2 activities on average. Additionally, grouping the 395 activities according to their modality produced 10 types of during-trip activities, as Table 4 details.

TABLE 4

Type and frequency of post-trip activities proposed

Type of post-trip activities	Frequency	%
Assembly	74	31
Artistic expressions	66	28
Workshop	23	10
Learnings assessment	19	8
Farm	15	6
Observing, seeing, identifying elements, animals, etc.	15	6
Audio-visual	12	5
Engaging other people	5	2
Others	4	2
Information registration	3	1

Source: own elaboration

The assembly or meeting between teachers and students is the most frequently planned by participants. In most cases, the assembly aims to talk about the learnings acquired during the trip. On other occasions, the objective is to ask questions, socialise or present something

prepared during or after the field trip. Exceptionally, one case proposes to evaluate hypotheses, and another proposes to discuss the students' emotions during the visit. On two occasions, the teachers proposed to reflect on the environmental crisis and attention to diversity in learning.

The second most frequent group of activities are artistic expressions related to what students saw during the field trip. The most common activity is mural making. To a lesser extent, the pre-service teachers proposed drawing, painting-colouring and theatrical performance as activities after the field trip. As exceptions, one case proposes making a mural with a critical stance towards the use of plastic, another proposes making a mural using index cards to classify according to the addressed topics, and another case proposes making a collage in a place outside the school.

Likewise, in a medium proportion, participants propose activities such as a) workshop (to build 3D models or representations of what they have seen or build a learning corner on the topic), b) explicitly assessing what they have learned through a Kahoot or the teacher ask questions (as exceptions, the teacher ask students to assess previous ideas or to reflect on the environmental crisis), c) aspects related to the farm (planting, plant monitoring, garden work), d) observe, identify, order or classify animals and plants (mostly) and e) use audio-visuals such as video, cards and photos to remember or deepen what students saw in the trip.

To a lesser extent, plans include a) involving people in the activities (mainly the family), b) a group of activities out of classification (bringing pets to the classroom, imagining nature and confusingly described activities) and c) registering what the students learned (in a notebook or adventure journal).

DISCUSSION

To answer the question: What transferable insights to improve pre-service ECE teacher education regarding field trips for science and environmental education emerge from pre-service teachers' learning output? The results described the field trips planned by the participants. The present section offers transferable insights to improve the pre-service ECE teacher education based on the analysis of their learning output.

Scope of places to visit and planned activities

Concerning the chosen place, within the 139 proposals, the most common places are farms (farm, farm-school or productive farm) and parks (national, natural or urban). However, there are other places in urban settings to explore due to their contribution to learning science and about the environment. Some examples of those places are recycling centres, market squares, urban parks, water purification centres and zoos (zoo planned only once). For example, some studies demonstrate that when children go to urban parks, their physical and emotional health and their perception of the environment improve (Bao et al., 2023; Beery, 2020).

Regarding the activities before the field trip, it is notable that many proposals focused on the teacher. In most cases, the plan is for the teacher to explain to students the previous concepts, requirements, rules, logistics, routes and activities concerning the field trip. Explanations by teachers are part of the work in the classroom, but it is advisable to look for alternatives that are more centred on students. Active pedagogies such as discovery, case studies, problem-solving, inquiry and projects (Cattaneo, 2017) are an option. On the other hand, some exceptions are worth highlighting a) planning, considering the cognitive and functional diversities of children, b) identifying prior ideas and promoting metacognitive processes, c) reflecting on the environmental crisis, and d) motivating students to recognise and acknowledge the guides for their contribution on the field trip.

On the other hand, it is not easy to state when an activity during the trip or visit is appropriate or not. This quality depends on age and curriculum. Regarding this dilemma, Tovar-Gálvez (2026) highlighted how learning theories account better for younger ages learning and philosophy of science for older ages. Thus, the author describes that Piaget's and Bruner's theories describe ECE students learning according to their biological development and representation modes. From this view, infants in their first years learn by incorporating information from the surroundings through the senses. When infants evolve in age, they can elaborate generalisations and more complex representations. Additionally, explains Tovar-Gálvez (2026), philosophy of science offers some models of science centred on inductive empiricism and models focused on deductive reasoning. Empiricism may be coherent with infants' first years, and deduction may be productive for older ages.

Consequently, observation, exploration, and free play are valid for younger ages since these foci contribute to the discovery or recognition of the environment (Espinoza-Freire, 2022). However, infants can benefit when teachers plan this discovery and exploration as a learning process (Dejonckheere et al., 2016; Nayfeld et al., 2011; Paños et al. 2022). In older ages, field trips need increasingly approach the intentional development of concepts, emotions, skills, processes and practices (Aguilera, 2018). From this perspective, the field trip is no longer limited to the tour, walk, visit or exploration, but there is a learning intention. Some activities to enrich the visit include worksheets in which students register or complete information, take photographs or videos with a purpose, interact with people, animals or places with a purpose, search for clues or characters/objects, ask questions permanently to guide learning, role-playing games about the trip, or workshops as an in-situ application of what students saw.

Observing the activities after the field trip, the participants planned them in a smaller proportion and with less variety than the activities before and during the field trip. There is also a tendency to plan sessions where teachers talk to students about what they have seen. It is not possible to assess how significant it is for learning to talk about the topic or things seen during the field trip. However, there is evidence from other studies about how beneficial for learning it is for subjects to elaborate something with the topics addressed, such as explanatory models (Tellez-Acosta et al., 2023). In this sense, artistic expressions could contribute more to learning since students transform, relate, connect, represent or contextualise what they have learned when they express it. On the other hand, some of the exceptional activities that could contribute to innovation are a) attention to diversity in learning, b) promoting a critical stance regarding the environmental crisis, c) assessing previous ideas and analysing them at the end, or d) engaging families in the learning processes.

In relation to other studies

Kisiel (2006) identifies the field trip activities teachers reported in a survey and enact in an authentic experience. The author classified the activities as a) teachers' plan of action, b) students' structured engagement, c) students' unstructured engagement, d) event documentation (registers as pictures), and e) teachers' supervision of students. However, the author points out a prevalence of unstructured engagement activities during the visit or trip. Kisiel defines this kind of activity as flexible and teacher-directed or teacher-centred. The current study converges with Kisiel's findings regarding the prevalence of teacher- or guide-cantered visits. The pre-service teachers who participated in this study often proposed pre- and post-trip activities as teachers' explanations of concepts or about the trip. Likewise, the participants in this research proposed, on some occasions, just the visit following the indications or the guide. Bravo et al. (2022) also identified that prospective ECE teachers planned and enacted field trips focused on teachers' explanations.

The mentioned convergence makes evident a problem that persists over time. Pre-service teachers still replay expositive and explanatory activities as the centre of the teaching and learning process. This issue is challenging for educators to consider, providing future teachers with new perspectives on planning and active pedagogies as a framework for field trips.

In another study, Ayotte-Beaudet et al., (2017) reviewed the literature on outdoor science education. The authors identified the strong predominance of developing biology content while neglecting other scientific disciplines. Likewise, Bravo et al. (2022) find that pre-service ECE teachers focus field trips on living things. The present study connects to the studies above. Pre-service teachers in this study reported farms and parks as primary places of visit and water-focused environments, forests, animal shelters, and botanical gardens as secondary places. This type of proposed place strongly emphasises the concepts of biology or the natural environment. In addition, the present study identified frequent visits to museums, but the topic needed to be more specific. Moreover, finally, visits to the planetarium are infrequent. This trend implies planning field trips looking for multi-, inter-, trans-disciplinary and intercultural processes to include other knowledge systems in field trips.

INSIGHTS TO QUALIFY THE PLANNING OF FIELD TRIPS FROM PRE-SERVICE TEACHERS' LEARNING

Field trips as part of school scientific projects

Field trips must go from developing general skills (Kızıltaş & Sak, 2018; Yıldırım & Özyılmaz Akamca, 2017) to being part of science teaching strategies (Torres-Porras et al., 2017). To introduce field trips in other strategies, teachers could plan not only considering conceptual content but also thinking skills (van der Graaf et al., 2015), procedures, practices or experiences (Berland et al., 2016) and values (Téllez-Acosta et al., 2018) typical of science.

Articulating field trips to the scientific method or inquiry is an alternative to cover the types of content mentioned. Authors such as Inan & Inan (2015) and Pérez-Martin et al. (2022) argue that the scientific method or inquiry at least integrates concepts and mental processes, actions and practices, and emotions and values specific to science, to understand, explain or solve phenomena or problems in contexts and everyday life. According to the mentioned processes, the field trip could be part of the scientific method or inquiry in different ways, a) to recognise the contexts to study or problems to solve (Fleischner et al., 2017), b) to collect the necessary information to construct explanations or solutions to problems (Kervinen et al., 2020), or c) to put into practice or disseminate what students learned in the inquiry process.

School scientific projects or project-based work is how teachers might articulate field trips to the scientific method or inquiry. Gerde et al. (2013), Tovar-Gálvez and Cárdenas (2012), van der Graaf et al. (2018) suggest that projects can include processes such as a) recognition of a context to identify a problem to solve and the students' previous ideas about it, b) hypotheses formulation as possible solutions to the problem, c) planning of activities to address the problem, including the students' organisation and a system for evaluating the project achievement, d) development of activities to consult, collect information, experiment, develop prototypes, build models, transform a system or process, build things, among others, e) analysis of the collected information or the actions carried out, f) evaluation of the hypotheses and the inquiry process, g) concluding, h) socialisation of results and learning, and i) definition of new questions or problems. Field trips could contribute at least to the recognition of contexts (a), execution and collection of information (d), and socialisation (h).

From another perspective, Ortega-Torres and Moncholí Pons (2021) propose the STSE (Science, Technology, Society and Environment) approach and co-teaching as the pillars to transform a field trip into a project for learning science and other disciplines.

Plan together with guides of places to visit

Teachers can enrich the planning and execution of a field trip when they collaborate with the guides or administrators of the place to visit. For example, since 2003, Anderson and Zhang have described the need to establish a dialogue between museums and teachers' needs or expectations in planning and implementing visits. In this sense, Giannakoudaki and Stavrou (2022) demonstrate that the disconnection between the guides of the research centres (as visiting places) and teachers is one factor that reduces the contribution of a field trip to learning. On the other hand, Tal et al. (2014) report experiences in which joint work between visiting place guides and teachers enhanced students' active learning and psychomotor activity. Furthermore, as an opportunity to overcome the disparity in objectives and agendas between guides and science teachers, Karnezou and Zoupidis (2020) describe a joint course between both parties. In the mentioned course, guides and teachers learn how to involve students in scientific inquiry projects that include the place of visit as a key to the process.

Expanded planning

Tovar-Gálvez (2026) proposes planning as a process for teacher education and professionalisation. Thus, teachers not only plan teaching, learning and assessment but engage in a self-training process by exploring dimensions beyond the technical requirements from educational policy. Consequently, planning expands its function including:

- Critical administration of teaching and learning: teachers evaluate the quality and contribution of the content sources they use (Tellez-Acosta et al., 2021; Vellopoulou & Ravanis, 2010), consider the student's prior knowledge and contexts (Cáceres et al., 2018; Guzmán, 2010; Ravanis et al., 2010), and look for empowering students to engage in their learning (Aizri et al., 2025).
- The ecologisation of knowledge systems: teachers plan to promote complex learnings from the multi-, inter-, trans-discipline and interculturality (Pacheco Calderón, 2019; Tovar-Gálvez, 2022, 2023).
- Metacognitive processes: teachers plan reflecting on their own pedagogical knowledge and practice and plan their professional development (Tovar-Gálvez, 2012).
- Classroom research: teachers plan by investigating their students' learning and using theoretical frameworks to transform educational reality (Tovar-Gálvez, 2018).

CONCLUSIONS

The analysis of the pre-service ECE teachers' learning output exposes elements and limitations like the reported by other studies, and some opportunities to improve their education. Thus, the content analysis reveals, a) farms and parks as the most frequent venues to visit, b) pre-trip activities mostly centred on the teacher, c) during-trip activities with a strong focus on the children's emotional, social and physical aspects but minimal on science learning, and d) post-trip activities with emphasis on artistic expressions. However, some insights to improve the pre-service ECE teachers' education regarding field trips emerged. Thus, there are three main transferable elements: a) transform field trips as school scientific projects, b) joint planning between teachers and guides of places to visit, and c) understanding

planning in its function of managing teaching and learning, but also as teachers' professional development.

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