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Analysis of prospective early childhood education teachers' proposals of nature field trips: An educational experience to bring nature close during this stage

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Abstract

Nature field trips stand out as pedagogical experiences because of their benefits in science learning, even in early childhood education (ECE). However, previous studies have found that teachers often do not make use of their full educational potential. The present research offers a descriptive exploration of ECE prospective teachers' enactment of nature field trips, detecting the difficulties they encounter and the mistakes they make. To this end, 205 videos were analyzed qualitatively to determine the pedagogical planning of nature field trips proposed and carried out by prospective ECE teachers. The results indicated that most of the participants designed nature field trips in which they could develop conceptual content related to living things through an expository method, with pupils having a passive role. They did not use activities, materials, questions, or evaluation during the trips, and neither did they integrate the trips into their classroom programming. This study adds to an understanding of how prospective teachers perceive nature field trips. Implications are presented for teacher educators working with preservice teachers to

build upon prepare them for implementing nature field trips with ECE students.

KEYWORDS
early childhood education, nature field trips, preservice teachers, science education, video analysis

1 | INTRODUCTION

In Spain, the goal of early childhood education (ECE) is to develop the basic skills necessary for the personal growth of the child in the different dimensions: sensory, affective, cognitive, and moral, among others (De Moya & Madrid, 2015). Some of the pedagogical principles that are considered at this stage are to carry out proposals that are of interest to the student, to make time flexible in activities, to individualize teaching, to have adequate spaces and materials, and to globalize teaching by relating different contents (Requena & Sainz, 2009).

Keeping the character of the ECE stage in mind, nature field trips can be an important pedagogical experience because field trips can bring many benefits, not only in the sciences contents learning but also providing a stimulating environment for learning, as it allows otherwise abstract content with the real world, just like improving students' interest and social skills (Ortega-Torres & Moncholí, 2021; Pace & Tesi, 2004; Prather, 1989; Ramachandiran & Dhanapal, 2016). However, for the previously cited benefits to occur when conducting nature field trips it is important that teachers plan the outings so that they are as productive as possible for their students' learning (Higgins et al., 2012). To provide resources about field trips is fundamental in training of teachers, because if preservice teachers are not enough prepared, they will not carry out field trips with their students (Ateşkan & Lane, 2016; Olson et al., 2001).

Considering that the most science contents in the ECE are usually related to the natural world as living beings or ecosystems (Born, 2018; Cantó et al., 2016; Lloret et al., 2017) and that it is more beneficial to use methodologies where the student is an active participant in learning (Marcos-Merino et al., 2019) the nature field trips are an ideal experience during this stage.

Therefore, the purpose of the present research was to analyze the pedagogical planning of nature field trips proposed by prospective ECE teachers using their own videos which they perform a nature field trip to ECE students. The study was aimed at examining and describing general aspects of nature field trips, such as the places visited, the content involved, the roles of the pupils and of the teacher, the activities and questions addressed, the methods used, the connection with the classroom curriculum, and evaluation. The research question for this descriptive study was: what aspects do ECE prospective teachers consider when developing nature field trips proposals before having theoretical knowledge about them?

1.1 | Teaching and learning science in ECE

Last decades' research has focused on children's understanding of scientific phenomena. On that subject, Fleer and Robbins (2003) compiled the following conclusions: children develop ideas about their environment based on their everyday experiences or culture, which may or may not coincide with those of school science, and some ECE children also give meaning to scientific learning based on their prior ideas, some of which do not change even with science teaching. However, French (2004) highlights that knowledge of natural environments in ECE has particular relevance for children's future academic education. Krapp and Prenzel (2011) and Tonucci (2012) emphasize that children between the ages of 3 and 6 years are able to observe the reality around them, formulate hypotheses and

theories, and participate in processes of inquiry, which can lead to a lasting and positive predisposition towards scientific content. Also, Gelman (1990) and Spektor-Levy et al. (2013) stated that children are an intrinsically interested and motivated to explore and enjoy the environment that surrounds them; even young children have been described by Worth and Grollman (2003) as "natural" scientists. Moreover, scientific content related to the causes, processes, and mechanisms that underlie different biological and physical phenomena are highly attractive for children at an early age since they are biologically prepared to learn about their environment (Brown, 1997; French, 2004; Piaget, 1967). Young children are able to use technical terms to label their experiences so that they can think about them in the absence of concrete materials. For example, Gordon (2006) observed that, through storytelling, Australian children developed a more scientific than everyday understanding of complex scientific terms. Therefore, ECE children do not necessarily need a "lowered" curriculum, but one adapted to their age and needs (Fleer, 1991).

The ability and relevance to learn science in the early years has already been studied. Different longitudinal studies, such as the Perry Preschool Project (Schweinhart & Weikart, 2002) or the Abecedarian Project (Campbell et al.,1998), have shown that early and effective exposure to different content in ECE students, as science or maths, cause positive effects in children later development not only in academical sphere, but also in personal, social, and economic ambits (Shonkoff & Fisher, 2013). In a more recent study, Cortázar (2015) also notes that programs aimed at early childhood care and education in Chile have a significantly favorable long-term effect regarding children's academic performance in the three subjects evaluated: Mathematics, Reading, and Social Sciences. Also in the United States, Mantzicopoulos et al. (2008) found evidence that, when children enrolled in ECE are given the opportunity to participate in activities of inquiry and scientific literacy, they enjoy science more, feel more competent to learn about it, and express a greater scientific competence than those who did fewer scientific activities.

One of the aspects that greatly influence in learning opportunities is the preparation of their teachers, not only in their previous years as secondary or higher education students but also during their teachers' initial preparation, specially in ECE teachers (Cantó-Doménech & Serrano, 2017; Mosquera et al., 2018). Is not only a problem in Spain but also in other countries as Colombia (Vallejo et al., 2013), Turkey (Erden & Sönmez, 2011), Germany (Barenthien et al., 2020), Zimbabwe (Gwimbi & Monk, 2003), the United States (Johnson, 2020), Greece (Tsitouridou, 1999), Jordan (Gheith & Al-Shawareb, 2016), or Sweden (Andersson & Gullberg, 2014), and among others. Recognizing this, science education as a discipline focuses on changing the way science is taught in a world with constant scientific-technological progress in a world that is facing increasing environmental challenges, and where students and future teachers interest in the knowledge of scientific-technological areas are declining (García-Ruiz & Sánchez, 2006; Johnstone, 1983; Mellado, 2003; Porlán, 1998; Vázquez-Alonso & Manassero-Mas, 2011). Research in science education highlights the importance of teaching scientific content in developmentally appropriate ways (Gómez-Motilla & Ruiz-Gallardo, 2016; Guisasola & Morentin, 2007a; Oliva & Acevedo, 2005; Stanley & Brickhouse, 2001), although science learning in ECE has remained in the background. As a result, there has been a deficit of research on science education on teaching and learning in early childhood (Aguilera, 2018; Almagro-Fernández et al., 2016).

Therefore, it is necessary that future ECE teachers been trained to develop scientific learning and competences in their students through pedagogical approaches that are distanced from the passive learning that are commonly observed in ECE classrooms. These active and participatory methodologies, such as science learning corners, games, inquiry, or experimentation can be effective and suitable for science learning in ECE stage, and beneficial that teachers can use it in their nature field trip to give their students experience making sense in nature (Cruz-Guzmán et al., 2017; Fernández-Oliveras et al., 2016; Gómez-Motilla & Ruiz-Gallardo, 2016; Puig et al., 2020; Yıldırım & Akamca, 2017).

Given this, it could be interesting to use models and programs that offer a comprehensive development of the child. Examples are the "forest kindergartens" in Japan, where children are outside most of the time and experience the natural world learning about plants or animals, or the "Swedish outdoor programs," which is very similar to the anterior program, but this promotes a sustainable way of life, environmentally responsible behavior and learning

about ecology through exploration in nature. Training prospective ECE teachers in these programs is essential for their implementation not to be hampered by outdated theoretical frameworks and opinions about children or a limited understanding on the prospective teachers' part of sustainability and pedagogical skills (Inoue et al., 2019). In teaching and learning natural environment, practical experiences should be the central element (Cutter-Mackenzie & Edwards, 2013), which is why nature field trips have sometimes been put forward as formal and informal educational experiences that can help children to approach nature by allowing them to participate in real natural phenomena in a real context (Meredith et al., 1997; Scarce, 1997).

1.2 | Nature field trips

For Aguilera (2018), these nature field trips are pedagogical experiences can be defined as fulfilling three key aspects: they take place outside the classroom, they pursue an educational goal, and they generate experiences for the pupils. Pedrinaci (2012) argues that activities of this type are very versatile, since they allow conceptual, procedural, and attitudinal content to be worked on, thus addressing aspects of the practices of science and fostering favorable values towards science and nature.

The effectiveness of field trips aimed at teaching and learning science has been studied and accepted in different educative stage as ECE, Primary or Secondary Education, and also in different phases of teacher training in countries as Spain, the United Kingdom, Israel, the United States, or Denmark (Del Toro & Morcillo, 2011; Dillon et al., 2006; Pasquier & Narguizian, 2006; Tal & Morag, 2009). It has been found that they enhance learning, allowing students to construct more knowledge, and of greater complexity, about the content worked on (Tenenbaum et al., 2004). The teachers can also offer content that supports the understanding of practices related to science, at the same time as improving and strengthening the relationship with their pupils and developing their own teaching practice (Del Toro & Morcillo, 2011, Dillon et al., 2005, Tal & Morag, 2009).

Given the physically nature of the young learners, nature field trips are an exceptional pedagogical experience for science learning. Field trips have the potential to bring many benefits in science learning compared to traditional teaching, as they provide a multisensory environment producing strong long-term memories (Jordet, 2010). This enhances the learning content, connecting abstract content developed in the classroom with the real world and improve the understanding of knowledge. Thus, these experiences are ideal for teaching nature-related content in ECE, such as forests or animals (Änggård, 2010).

1.3 | Relevant aspects for a productive nature field trips

Enacting a nature field trip that is also supportive of young learners science development is a very complex task (Orion & Hofstein, 1994); any teachers have difficulties to plan and carry them out (Eshach, 2007). Adequate planning of these educational experiences is key to achieving the benefits provided by nature field trips (Aguilera, 2018; Garcia & Bermudez, 2018; Kisiel, 2007; Pedrinaci, 2012). Careful planning must take in consideration of the objectives of these experiences, with the aim of these experiences were as beneficial and productive as possible, different aspects must be considered.

First, as nature field trips are an activity that takes place outside the classroom, it is important that one of the main aspects to highlight is the place where it happens. In this sense, the nature field trips place should be the result of the teacher's reflection, since it should help and facilitate the learning of content, provide experiences that cannot be replicated in the classroom; and, at the same time, motivate students (DeWitt & Storksdieck, 2008; Morag & Tal, 2012).

In this sense, the place is related to the topic. An adequate contents selection addressed in a field trip is required because they should help to achieve the established objectives (Rebelo et al., 2011). Different reviews

describe that the topics most used in nature field trips are those linked to ecology and biology (Aguilera, 2018; Ayotte-Beaudet et al., 2017). These contents related to living beings in general or to the environment where they live constitute highly developed and appropriate topics for the young learners (Born, 2018; Cantó et al., 2016; Lloret et al., 2017) as well as for conducting nature field trips (Ateşkan & Lane, 2016). In addition, conceptual, procedural, and attitudinal content should be promoted in nature field trips, as these experiences enable observation, enquiry, and discussion and can foster positive attitudes towards science (Del Toro & Morcillo, 2011; Eshach, 2007).

The activities are another important element in a nature field trips (Pedrinaci et al., 1994), as they can encourage active and interactive learning and make connections to the objectives and classroom lessons (Martin & Sewers, 2003; Orion & Hofstein, 1994), facilitating the integration of this experience with the study program and with their life experiences (Bamberger & Tal, 2007), and even relating it with other areas as arts, mathematics, or history (Pasquier & Narguizian, 2006).

Also, science process skills and procedural contents can be developed through the activities. Carrying out small and simple investigations engage students' curiosity and attention (Mazas et al., 2021) and at the same time bring teachers to develop a nature field trips through the inquiry methodology, allowing for children become scientists during the field trip (Pasquier & Narguizian, 2006; Pedrinaci et al., 1994). This, in conjunction with the use appropriate material resources (Orion & Hofstein, 1994; Pedrinaci et al., 1994; Urones & Sánchez-Barbudo, 1997) contributes to students playing an active role during the nature field trips, something essential in supporting students science learning (Fleischner et al., 2017; Tal et al., 2014).

In addition, for a nature field trip to be effective in supporting the learning of young children, they must be integrated into the classroom programming through pre- and post-activities. Research findings indicate that prior activities provide knowledge that helps students with understanding the experiences, while activities afterwards favor solidifying the new connections, give additional context for future experiences, and provide continuity in the learning (Anderson et al., 2006, 1999; Guisasola & Morentin, 2007b). A number of authors have noted that one of the greatest motivations for teachers to carry out field trips is to connect the trips with the curriculum and even teachers consider this to be one of the most important aspects when they are planning field trips (Anderson & Zhang, 2003; Kisiel, 2005).

Assessments are often overlooked, but essential aspects of nature field trips. Through assessments, both formative and summative, it makes possible to justify nature field trips as “real schoolwork” with parents and school community (Kervinen et al., 2020; Rebelo et al., 2011).

Lastly, a key factor for a good development and success of nature field trip is the teacher. It is currently accepted that a well-structured conversation promotes academic learning (Michaels & O'Connor, 2015), so it is important to consider the way in which teacher communicates information to students and engages students in sensemaking, either through explanations, descriptions, arguments, or by asking questions (Aragüés et al., 2014; Brousseau, 1986).

Thus, the success of a nature field trip in supporting students' science learning depends heavily on the practices of the teacher, making it essential to better understand how teacher preparation for ECE teachers support such efforts.

1.4 | The (scientific) training of ECE teachers

In Spain, to be able to practise as a teacher, it is necessary to have the title of graduate in ECE or Primary Education. These university degrees are in the humanistic and social area, which is why most prospective teachers access this training after previously having completed upper Secondary Education in social sciences or humanities and then passing the university entrance examinations. This implies that some prospective teachers have been more than 3 years without studying any scientific subject when they begin their initial teacher training.

The preparation program of ECE teachers lasts 4 years, that is, eight semesters, in which different basic training, pedagogical, and discipline-specific subjects are worked on. They carry out teaching practicums in schools for two semesters, normally during the second and fourth year, and finish with an end-of-degree project.

Although the current Spanish education law promotes the scientific knowledge in ECE, establishing as general objectives of ECE "to observe and explore their familiar, natural, and social environment," and that "they will progressively achieve [...] the discovery of physical and social characteristics of the environment in which they live" (Ley Orgánica 2/2006, de 3 de mayo, de Educación), only about 10 of the total 240 European credits are allocated to learning science and mathematics (Román & Cano, 2008). This indicates the little relevance given to science in training ECE teachers in Spain. In addition, many prospective teachers have had little scientific training during their last years as pupils themselves, and it is common to find ECE teachers that usually experience fewer positive emotions and more negative emotions, such as fear, anger, or sadness, when teaching scientific content in the classroom compared to any other content (Bravo et al., 2019).

These factors and others related to teachers' attitudes or beliefs, such as low self-efficacy (Greenfield et al., 2009) or aversion to science stemming from their school experiences (Edwards & Loveridge, 2011), may contribute teachers to feel unprepared to teach ECE students science or even unwilling to do it (Pendergast et al., 2017). For these reasons, the prospective teachers, on many occasions, focus only on working with aspects related to the transmission of attitudes or values instead of theoretical and practical content related to science, developing current issues related to environmental education in the ECE, such as biodiversity or climate change (Rojano & Jiménez, 2017).

1.5 | Nature field trips and teacher preparation

The aforementioned difficulties faced by prospective teachers in science learning and teaching are evident, and the designing and implementation of nature field trips is one of these problems, even for in-service teachers (Howitt, 2007; Kisiel, 2007; Tal, 2001).

It has been observed that when prospective teachers go on nature field trips during their training they attain a higher level of knowledge, skills, and practical experience as well as an increase in their self-confidence as teachers (Bozdoğan, 2012). If these field trips are aimed at learning about the natural environment then contact with nature is favored, which makes the prospective teachers more aware of its importance which they are likely later to transmit to their own pupils. In addition, through interacting with in-service science teachers, they gain valuable experience, such as learning how to use scientific materials or cultivating the emotion for learning science and the relevance of science in life (Jung & Tonso, 2006; Torres-Porras et al., 2017).

However, it has been observed that the teachers' experience does not always imply differences in their concerns when planning and carrying out educational field trips. Kisiel (2007) observed that US teachers had somewhat contradictory perspectives and objectives, and that they were preoccupied with controlling the class and with the content regarding the depth, interests, and level of their pupils, and that all this might have no link to their teaching experience. Even so, for Ritchie and Coughlan (2004), there needs to be more research into the educational value of field trips to justify the time teachers spend planning and implementing them.

2 | METHODS

The main aim of this descriptive exploration study is to analyze the pedagogical planning of nature field trips proposed by prospective ECE teachers. Video recordings which prospective teachers performed a nature field trip to ECE students were used as primary data, which were analyzed through the qualitative method

(Costillo et al., 2014). The sample description, the activity, the research method and the categories employed in this study are described below.

2.1 | Sample

The sample consisted of 205 prospective teachers who were in the third year of their initial teacher preparation at the Faculty of Education of the University of Extremadura (Spain). The total sample comprised three groups of students in three different academic years: 2016–2017 (n = 72), 2017–2018 (n = 75), and 2018–2019 (n = 58). The sociodemographic characteristics of the total sample (205) are: 96.1% of the participants were women between the ages of 20 and 24 years (87%). More than half of the sample had enrolled in university after having studied social sciences or humanities in Upper Secondary Education (55%), and only 20% had studied science and technology in Upper Secondary Education. It should be noted that this group of prospective ECE teachers included novices at designing and implementing nature field trips. Because they were novices their instructional choices and moves are emergent rather than fully formed. For the choice of the sample: first, the participants were already in their third year, so they had had a full semester dedicated to practices in real schools the previous year; and second, our participants were studying the subject "Knowledge of the Natural Environment in Early Childhood Education," the only one that deals with teaching science content throughout their initial training.

2.2 | Data collection

This study occurs in the context of the course entitled "Knowledge of the Natural Environment in Early Childhood Education." This subject has a double objective in the initial ECE teachers: on the one hand, it develops basic scientific contents related to biology, geology, physic, and chemistry, and on the other hand, in this subject professor trains prospective teachers in science education, providing them several experiences, activities or interventions to teach ECE students science contents.

Therefore, during the first session of the degree course subject in which this study was framed, and to avoid possible future influences from the subject itself, the prospective teachers were asked to record themselves on video. They were asked the following:

> "You must record yourselves carrying out a field trip to the natural environment with your Early Childhood class, acting as teachers throughout the recording, and as if you had your own pupils in front of you. The video must last between 3 and 5 min approximately so that we can view them in the classroom after you give them in."

The video could be made in two different ways, at the choice of the future teachers: recording their video continuously or recording small videos and editing them until the final video is composed.

In these videos, the future teachers had to show a nature field trip, performing a simulation where they take the role of teachers and in which the presence of children was not required. However, some of them involved children (6.3%) or even other classmates (1.95%) who took the role of students to better exemplify the nature field trip in their videos. All of the prospective teachers recorded themselves doing a nature field trip, not describing them.

The objective of this task was to do an initial assessment of the prospective ECE teachers. By these videos, professor can check the theoretical and didactical knowledge of science education and analyze the prospective teachers' planning and performance when faced with the task of carrying out a field trip to the natural environment as realistically.

We chose to analyze three different groups since we needed a large sample and in each course we only had access to one group of students, so data collection in this study was during three different courses. Despite that, data were kept as consistent as possible. Except for the number of participants, which ranged from 58 to 75, the three groups analyzed were indeed fairly similar: they were requested to do the task at the same moment and in the same way in the course: during the first session on the subject, the subject was taught by the same teachers and with the same content, the three groups had the same previous practicum experiences, and their sociodemographic characteristics were similar.

2.3 | Data analysis

The primary data source used in this study was the analysis of video recordings, based on the study by Costillo et al. (2014). For the analysis of this study, we used a qualitative method. This was a descriptive exploration study since the purpose of the research was to improve the understanding of the action taken by the participants (Stenhouse, 1985), that is, to increase knowledge about nature field trip proposed by prospective ECE teachers.

Total of three rounds of data analysis were made of the videos at three different moments: an initial analysis, carried out by one of the authors and teacher of the subject to the different groups studied, in which some of the categories were discovered; a second analysis, carried out by another author unrelated to teaching that subject, consisting of a much deeper analysis than the initial one; and a final analysis that was carried out jointly among the authors to reinforce and share the findings of the first two analyses.

The online webQDA software package was used in the qualitative analysis of the videos. This allows videos to be analyzed without the need for them to be transcribed, with various researchers working collaboratively (Neri et al., 2016). WebQDA provided us the frequency counts of each category, and the Excel spreadsheet software was used to obtain the percentages to create the data tables for the results. The statistical software package SPSS v.22 was used to compile the sociodemographic data of the sample.

2.4 | Categories

At the outset of this study, we collected and analyzed coding schemes used in similar research (Aragüés et al., 2014; Carrillo & Contreras, 1995; Ferrer-Bueno et al., 2016; Kleinknecht & Gröschner, 2016). The different initial topics and categories obtained evolved as our study progressed to the analytical phase. After the first viewing and analysis of the videos, new relevant categories were added to be studied further. The researchers proposed some categories and discarded others until consensus had been reached. We obtained these categories on the basis of content analysis, that is, a methodological approach that becomes a set of communication analysis techniques using procedures for the systematic and objective description of the content of the message (Bardin, 1996). Table 1 lists the categories and the source or authors they were obtained from.

The interactions between the teachers and children were captured through systematic observation on the part of the researchers who analyzed the moments in the videos at which the prospective teachers interact verbally with their pupils. In some videos, these pupils were represented by children or adults related to the participants (peers, siblings, nephews, nieces, etc.), and the prospective teacher used certain formulas in the videos such as (“hello children” or “today we have come from school to the countryside”).

By conceptual content, we shall mean whether the prospective teacher dedicates the field trip to work on some theoretical content, for example, content in which the different parts of a plant or the animals found in a river are only named and described. Procedural content will refer to the execution of an action, for example, to look for and observe branches or leaves of trees to know their characteristics or to pick vegetables in a market garden. Finally,

TABLE 1 Categories used for the study, citing the source or authors used for each category

Video location (Categories based on content analysis)	Natural environment	Fields: dehesa (evergreen oak parkland systems). Aquatic environments. Farms and orchards. Others.
	Urban environment	Parks and gardens. Urban area.
	Other	
Theme chosen (Categories based on content analysis)	Living beings	Trees. Plants. Flora and fauna of a natural environment. Animals. Trees and their fruits.
	Elements of the environment	River. Natural elements.
	Ecosystems	Importance of the environment in society. Types of environments.
	Other themes	Historical content. Seasons. Geology. Orchard.
	Cross-cutting content	Water. Recycling.
Types of content (Categories based on content analysis)	Conceptual. Procedural. Attitudinal	
Activities (Categories based on content analysis)	Carrying out activities	Yes. No.
	Type of activity	Spontaneous activity. Prepared activity. Activity integrated with other areas.
Form of carrying out the nature field trip (Categories based on content analysis)	Presents printed material. Presents material from the natural environment. Presents material in digital format. Use of printed material. Use of material from the natural environment. Use of everyday objects. Does not show or use material.	
Teacher's role (Aragüés et al., 2014; Ferrer-Bueno et al., 2016; Kleinknecht & Gröschner, 2016)	Difficulties and inaccuracies	In the pedagogical transposition to ECE. In conceptual content. In procedural content.
	Language skills	Describe. Explain. Reason.
	Explaining norms of behavior	Yes. No.
Questions (Aragüés et al., 2014)	Asking questions	Yes. No.
	Types of question	Open. Closed. Connected to students' everyday experiences.
Pupils' role (Carrillo & Contreras, 1995)	Active. Passive.	
Methodological intervention (Carrillo & Contreras, 1995; Kleinknecht & Gröschner, 2016)	Integration of activity in the classroom	Previous allusion to the nature field trip. Subsequent allusion to the nature field trip. Not integrated.
	Method used	Expository-traditional. Scientific inquiry.
	Evaluation	Yes. No.

attitudinal content will be that through which behavior and attitudes are developed, such as collecting trash from the natural environment for recycling or looking after animals on a farm.

Regarding the type of activities proposed, we have distinguished between spontaneous activities which are those performed by the teacher without their having been prepared previously (e.g., the search for certain plants in a park), prepared activities, those prepared by the prospective teacher (e.g., they take materials prepared to carry out these activities, such as handkerchiefs, observation sheets, cards), and activities integrated with other areas, those which connect with other areas of the curriculum (e.g., the dramatization of a story or folk-tale related to the field trip in the natural environment).

The topic "the form of carrying out the field trip," we distinguish between the categories "sample material" and "use of material." When we refer to the former category (sample material, etc.), we mean that the teacher is addressing a certain matter when imparting the explanation of the topic, for example, the prospective teacher shows different types of trees to the pupils so that they can observe the differences. With the other category (use of material, etc.), we refer to when the teacher uses certain materials to carry out an activity with the pupils, for example, when the prospective teacher uses seeds or seedlings for the pupils themselves to plant. Finally, in language skills we distinguished between describe, explain, and reason. Describe was used when prospective teachers detail what something is like, explain was referred to make something understandable for students, whereas reason was used when participants related ideas to come a conclusion. In results, examples are shown of these categories.

We would like to clarify that some categories were not exclusive, that is, a given participant could have various options in the same category. These categories were: the topic chosen, the types of content, the role of the teacher, and the integration of the activity in the classroom. For example, some participants worked on two different topics during the trip (e.g., recycling and plants), or on various types of content (e.g., the concept of types of trees at the same time as caring for and respecting them). In the type of questions that the prospective teachers asked, in the same recording it is possible to find both open questions and questions unrelated to learning.

3 | RESULTS

3.1 | Video location

The places most used to carry out nature field trips (Table 2) are those considered to be natural environments (61.5%), with the countryside (36.1%) and aquatic environments (15.1%) being the most visited. Also quite a lot of the prospective teachers carried out trips to an urban environment (37.5%), with visits to parks and gardens predominating at more than 30% of the total.

3.2 | Theme chosen

The theme the prospective teachers preferred to work on during these nature field trips was living things, chosen by more than 75% of our participants (Table 3). Within this major category there especially predominated such topics as the flora and fauna of the natural environment visited (28.3%), trees (18.5%), and animals (11.7%). Another important category comprises topics related to other elements of the environment and was chosen by 12.2% of the prospective teachers.

Also worth noting is knowledge about ecosystems or the environment (7.8%), and other topics (7.4%) in which themes related to History or Geology are considered. These are more frequent than cross-cutting content which was chosen by only 4.4% of the prospective teachers.

TABLE 2 Results for the "Video location" category

Video location			
Categories	**Subcategories**	**Total (*n*)**	**Total (%)**
Natural environment		**126**	**61.5**
	Fields: dehesa (evergreen oak parkland systems)	74	36.1
	Aquatic environments	32	15.6
	Farms and orchards	18	8.8
	Others	2	1.0
Urban environment		**77**	**37.5**
	Parks and gardens	63	30.7
	Urban area	14	6.8
Other environments		**1**	**0.5**

TABLE 3 Results for the "Theme chosen" category

Theme chosen			
Categories	**Subcategories**	**Total (*n*)**	**Total (%)**
Living beings		**155**	**75.6**
	Flora and fauna of a natural environment	58	28.3
	Trees	38	18.5
	Animals	24	11.7
	Plants	20	9.8
	Trees and their fruits	15	7.3
Elements of the environment		**25**	**12.2**
	Natural elements	15	7.3
	River	10	4.9
Ecosystems		**16**	**7.8**
	Importance of the environment in society	13	6.3
	Types of environments	3	1.5
Other themes		**15**	**7.4**
	Seasons	6	2.9
	Market garden	4	2.0
	Geology	3	1.5
	Historical content	2	1.0
Cross-cutting content		**9**	**4.4**
	Recycling	7	3.4
	Water	2	1.0

3.3 | Types of content

Regarding the type of content worked on, the conceptual predominates, followed by attitudinal and, last, procedural (Table 4). Using the theme of plants as an example, in the videos we observed that most of the participants explained the types or parts of a plant in a theoretical way, as conceptual content, while others used it to develop positive caring attitudes towards plants and living beings in general, thus working with attitudinal content. Finally, some recordings showed participants teaching some techniques such as growing vegetables or picking fruit, which would fall into the category of procedural content.

Just 3.9% of prospective teachers use the three types of content in their nature field trips, while 38.5% combine two types of content (conceptual and attitudinal: 24.9%; conceptual and procedural: 11.2%; and procedural and attitudinal: 2.4%). Nevertheless, most future teachers (51.7%) use exclusively conceptual content, whereas 4.4% use only procedural content and 1.5% use exclusively attitudinal content.

3.4 | Activities

In their nature field trips, 43.6% of our participants carry out some activities (Table 5).

The majority chose to carry out previously prepared activities (55.4%). As examples, one of the prospective teachers carried out an activity in which her "pupils" traced on a sheet of paper the texture of different natural elements (tree bark, leaves, stones, etc.), while another asked the children to collect the trash off the ground and classify it, to then throw it into the recycling container they had made in the classroom. Others proposed spontaneous activities "on the go," for example, the collection of natural elements that might be found (branches, sand, fallen fruits, leaves, etc.) or the observation of insects under magnifying glasses. We also noted some activities related to other areas (14.2%), such as literature, music, or art, among others. Some examples of this type of activity are making musical instruments using natural elements such as stones or leaves, creating murals that represent the landscapes visited, or the active listening and dramatization of stories related to the river visited.

TABLE 4 Results for the "Types of content" category

Types of content		
	Total (*n*)	**Total (%)**
Categories		
Conceptual	183	89.3
Attitudinal	73	35.6
Procedural	37	18.0
Combinations		
Only conceptual	106	51.7
Conceptual and attitudinal	51	24.9
Conceptual and procedural	23	11.2
Only procedural	9	4.4
Conceptual, procedural and attitudinal	8	3.9
Procedural and attitudinal	5	2.4
Only attitudinal	3	1.5

TABLE 5 Results for the "Activities" category

Activities		
Categories	**Total (*n*)**	**Total (%)**
Carrying out activities	202[a]	
No	114	56.4
Yes	88	43.6
Types of activities	92	
Prepared activity	51	55.4
Spontaneous activity	28	30.4
Activity integrated with other areas	13	14.2

[a]In some videos it was impossible to categorize this question.

TABLE 6 Results for the "Form of carrying out the nature field trips" category

Form of carrying out the nature field trip		
Categories	**Total (*n*)**	**Total (%)**
Does not show or use material	79	38.5
Presents material from the natural environment	52	25.4
Use of material from the natural environment	33	16.1
Use of everyday objects	22	10.7
Presents printed material	10	4.9
Use of printed material	8	3.9
Presents material in digital format	1	0.5

3.5 | Form of carrying out the nature field trip

More than 60% of the prospective teachers analyzed show or use any type of material in the nature field trip they proposed (Table 6).

Materials from the natural environment were shown to their pupils by 25.4% of the participants. For example, some of those prospective teachers showed their pupils flowers to learn the parts, seeds to observe similarities and differences, rocks with different characteristics, eggs, or feathers of different birds. In addition to displaying these materials, many used them to carry out such activities as planting seeds, decorating stones of slate, or sensory stimulation through touch (such as touching tree bark, petals, grass, earth, stones, etc.) and smell (such as smelling the wet earth or the flowers they come across in the field), among others.

We also observed that some of the prospective teachers analyzed (10.7%) used everyday materials to support their nature field trips. For example, some participants used gardening tools to plant seeds (watering cans, spades, rakes, etc.), glass jars to put insects in for a few minutes to be able to observe them in more detail, or cardboard boxes in which they could put the different types of trash in the corresponding recycling containers. We should also highlight that some prospective teachers showed (4.9%) or used (3.9%) printed materials, such as posters of the natural spaces visited which displayed information and images about the flora and fauna of the place, cards with images of plants the children had to find, cards to be filled in with texts or drawings, and even printed signs related

to the environment (such as the animal paths in the wild or an area with animals in danger of extinction). Finally, only one participant used the computer to display material in digital format in their field trip.

3.6 | Teacher's role

Regarding the teacher's role, we further divided this category to make it easier to differentiate the various aspects (Table 7).

For this, we analyzed the participants' difficulties and inaccuracies. Some showed them in the pedagogical transposition to ECE (3.4%) since they were not able to fully adapt the content to their pupils' level. An example of this is that they usually gave pupils data that was difficult to assimilate ("this reservoir was built in the 2nd century by the Romans," or "the River Guadiana measures 742 km") or they provide complex definitions beyond the age of the children the explanations were intended for ("the leaves are green because they are formed by pigments called chlorophyll") or even sometimes wrong ("photosynthesis is the transformation of organic substances and mineral salts into energy").

Regarding the difficulties and inaccuracies in the conceptual content, we observed some mistakes in the data given by 4.4% of the participating prospective teachers, such as saying that "bunnies only feed on carrots" or "the reservoir is not an aquatic ecosystem." The only procedural inaccuracies that we detected was when a participant was preparing to recycle with their future pupils and deposited the paper and glass in the corresponding containers, but the items were inside a plastic bag that was also put in the container.

Concerning linguistic skills, 72.2% of the prospective teachers explained content on their nature field trip: "the water of rivers comes from the water droplets that fall from the clouds and that also fill reservoirs, seas, or springs," "plants are living beings like us because they are born, grow, reproduce, and die," or "a habitat is the place where animals live, but not all animals live in the same place: a dog cannot live in water, nor a fish out of water." The majority also described the environment in which they found themselves or the different elements for their pupils to learn: "in this natural environment, there is the River Guadiana, we can see the Lusitania Bridge, and over there we can also see the Railway Bridge which is made of iron," "the petals of this flower are pink and white, and those

TABLE 7 Results for the "Teacher's role" category

The teacher's role		
Categories	**Total (*n*)**	**Total (%)**
Difficulties and inaccuracies		
In conceptual content	9	4.4
In the didactic transposition to early childhood education	7	3.4
In procedural content	1	0.5
Language skills		
Explain	148	72.2
Describe	141	68.8
Reason	8	3.9
Explaining norms of behavior	200[a]	
No	166	83.0
Yes	34	17.0

[a]In some videos, this was impossible to categorize.

there are yellow," or "stalactites are the ones that come from the ceiling, and the ones that form from the ground are stalagmites, both are very large and they look like glass, they are very pretty." Only 3.9% tried to reason with their pupils to help them access the knowledge being put forward: "rain is very important for life: if it did not rain, trees would be tiny, they would not be able to make oxygen and living beings would not be able to breathe that air." It is important to clarify that some of the prospective teachers showed different language skills in the same field trip.

Finally, we observed that in nature field trips only 17% of the total of the participants explained behavioral norms, such as "we must walk hand in hand and carefully," or "we must be silent," "we put ourselves in a circle on the ground," or "we must keep all the paper in a bag to throw it in the container afterwards and not litter the countryside."

3.7 | Questions

Nearly half of the participants ask their pupils questions during their nature field trips (Table 8). Some of them even asked different types of questions on the same trip. Of the questions asked by the prospective teachers, 60.2% were open. For example: "The landscape we have come to visit, what is it like?," "What animals can we find in this park?," or "What meals can we prepare with the food we have planted in the garden?," while 17.8% of the questions were closed, such as: "What are the most typical trees in the area we are in?," "What is the fruit of the olive tree? And what products do we get from them?," or "What is the name of that animal we see there (pointing to some sheep)?." It was also observed that many of the questions asked did not be directly related to learning, but it was potentially connected to students' everyday experiences, such as: "Do you like trees?," "Have you ever eaten grapes on New Year's Eve with your family?," "Do you want to meet the farm animals," or "Do you think we will manage to collect all the garbage from this park?."

3.8 | Pupils' role

The results show that most of the participants gave their pupils a passive role, in which the pupils almost exclusively listened to their teacher (Table 9). In most of the nature field trips that did focus on giving the pupils an active role (which represented 23.5% of the total), we observed that the prospective teacher asked the children to explore the natural environment in search of different elements, and that there were some variants depending on the particular

TABLE 8 Results for the "Questions" category

Questions		
Categories	**Total (*n*)**	**Total (%)**
Asking questions	**203**[a]	
No	108	53.2
Yes	95	46.8
Type of questions	**118**	
Open	71	60.2
Connected to students' everyday experiences	26	22.0
Closed	21	17.8

[a]In some videos, this was impossible to categorize.

TABLE 9 Results for the "Pupils' role" category

Pupils' role		
Categories	**Total (n = 200[a])**	**Total (%)**
Passive	153	76.5
Active	47	23.5

[a]In some videos, this was impossible to categorize.

TABLE 10 Results (%) category "Methodological intervention"

Methodological intervention		
Categories	**Total (n)**	**Total (%)**
Integration in the classroom	(n = 212)	
No integration	118	55.6
Previous allusion to the nature field trip	58	27.4
Subsequent allusion to the nature field trip	36	17.0
Methodology	(n = 198)[a]	
Expository-traditional	179	90.4
Scientific inquiry	19	9.6
Evaluation	(n = 201)[a]	
No	199	99.1
Yes	2	0.9

[a]In some videos, this was impossible to categorize.

prospective teacher: some formed pairs or groups of pupils to carry out the searches, others asked the pupils to search for a specific set of elements (living beings, inert beings, fruits or things that have fallen to the ground). It is also very common in these nature field trips to cover the pupils' eyes so that they can get to know and recognize the elements of the environment through touch or smell, even combining this activity with the aforementioned search for objects. In other nature field trips, the participants took their pupils to places in which animals are living, such as farms, and got them to participate in the everyday activities that take place there: feeding animals, collecting eggs, milking cows, or cleaning the space in which they live. Others dedicated the trip to working in a market garden, in which the pupils planted fruit trees and vegetables, made small signs to recognize what has been planted, learnt the basic care of the garden, collected the harvest, or prepared recipes in which they used what had been harvested (such as fruit or vegetable salads and juices).

3.9 | Teaching approaches

Almost 28% of our participants referred to lessons or content they had worked on previously, such as: "If you remember, we saw the characteristics of living beings in class," "As we saw in the previous class, we live on a planet called Earth, which is mainly made up of water," "Do you remember the story we read in class last week: The Ugly Duckling?," or "Depending on the season we are in, which as we have already learned in class can be spring, summer, autumn, or winter, the colour of the leaves on the trees changes or they even do not have any colour."

Similarly, 17% referred to upcoming classes through activities that will be carried out based on the content developed in the nature field trip, with phrases such as: "We are going to look for insects around here, and in class we will recall them, we will look at photos of them, and learn how they behave," "Later in class we will create our own reservoir to see how it works, and use it to water our plants," "Next day, in class, we will look at photos about the different animals and their habitats," or "We are going to go to class to prepare and eat some toast with olive oil which is very healthy." Some prospective teachers made forward-looking and backward-looking allusions in the same field trip (Table 10).

With regard to the methods used by the prospective teachers, we observed that the great majority would carry out nature field trips in which the expository and traditional method predominates, compared with 9.6% of the participants who used methods of scientific inquiry. This latter group largely coincided with those who gave their pupils an active role. Finally, one of the most disconcerting results we obtained is related to evaluation since only two of our participants would evaluate their pupils after carrying out nature field trips: one through oral questions at the end of the trip about the topic that had been worked on, and the other through drawings about what had been learnt.

4 | DISCUSSION

The present study offers a novel and relevant perspective in the analysis of nature field trips, since it explores numerous elements of the same instead of focusing on one of them. Results of this descriptive research not only illustrates the prospective ECE teachers' notions but also their actions in a nature field trip. These results help to advance in the knowledge of nature field trips' use as a pedagogical strategy by deepening the different elements that compose it, improving their educational quality in all educational stages, and specifically in ECE (Kermani & Aldemir, 2015).

Thus, these findings clarifying and showing initial teachers' ideas and can serve as a starting point for teacher educators to improve the initial and continuous education of ECE educators through a valuable experience as nature field trips. An adequate and exhaustive ECE teacher initial training in science education can cause an improvement in the quality of early scientific education. Considering the multinational research by Lindemann-Matthies et al. (2011), actual experience of outdoor teaching during teacher training can increase confidence, perceived competence, and motivation of prospective teachers to do nature field trips with their ECE students that, together with providing tools and experiences to future teachers to teach science, could increases their self-efficacy. These positive beliefs in themselves are related to the practices used by teachers to encourage science in ECE (Gerde et al., 2018).

Having this in mind, exposing prospective teachers to places in which science is learnt informally, such as museums or nature centers, has the potential to improve their perception of how these places can benefit learning, in addition to helping them feel more secure and more comfortable. It is therefore important to make field trips a part of initial teacher preparation (Kisiel, 2013; Tal, 2001) in Spain and in other countries since we believe that our results can be generalized to other contexts. We know that ECE education systems are very different in each country, but teacher training is a concerning in all of them because is one of the factors that most influences the pedagogy carried out in ECE classrooms (Anders, 2014).

For this reason, we analyzed different aspects of the nature field trips designed by prospective teachers. The most common places to carry out nature field trips were the park, the countryside, and the river. These results agree with those of Aguilera (2018) who notes that outings to natural spaces are among the contexts in which most nature field trips are carried out. During the last 50 years, there has been a tendency for class outings to be to places outdoors since most research has focused on the educational potential of these environments (DeWitt & Storksdieck, 2008). It has also been observed in teacher training those outdoor activities, such as creating school

vegetable gardens, offer multiple benefits such as spending time in the open air, observing nature, and improving attitudes towards food or the environment (Alcántara et al., 2019).

Our results coincide with those of Gil Quílez et al. (2017) in observing that prospective ECE teachers mainly work on theoretical or conceptual content during their nature field trips. This is contrary to the traditional case when nature field trips were used to develop attitudes and values (Meredith et al., 1997) and that some authors continue using when they carry out nature field trips, specially promoting attitudes related to environment (Ayotte-Beaudet et al., 2017). This could indicate an evolution in the way nature field trips are conceived of, and a belief that young children are fully capable of participating in scientific activities and inquiry (Spektor-Levy et al., 2013). It is also probable that the tendency prospective teachers have of imitating their own academic training has something to do with these results since, during initial teacher education for this stage, greater importance is given to conceptual content than to procedural content (De Pro-Bueno et al., 2019).

Our results also seem to follow the trend to develop content related to the environment, biology, and geology contents (Aguilera, 2018; Ayotte-Beaudet et al., 2017), because of our prospective teachers developed, principally, themes as biodiversity, ecosystems, plants, animals, or water systems.

Nevertheless, the absence of procedural content in nature field trips is highly relevant. In United States, Storksdieck et al. (2007) find that, during the field trips, practical skills involving the practices of science can be included as a valuable complement to the teaching. The possibility of working on the practical aspects of science has many advantages for pupils from ECE to Secondary Education, such as obtaining more positive results when learning or acquiring skills, although practical work continues to receive little attention in German and Spanish classrooms (Itzek-Greulich & Vollmer, 2017; Sanmartí, 2000).

We also observed that many of prospective teachers analyzed do some activities during their nature field trips, being these planned according to the objectives proposed for the field trip and not the other way round and underline their value as reinforcement for learning (Aguilera, 2018). Also, many of them would integrate other areas of learning into the activities they proposed. This is a positive finding as other research in Spain or the Netherlands has shown that including interdisciplinary learning opportunities can enhance learning in ECE, Primary and Secondary Education (Chao et al., 2015; De Haan et al., 2014; Fernández-Ferre & González-García, 2017).

The lack of use of resources observed in this study may be related to results of the Appleton and Kindt (2002) study that Australian novice teachers try to "survive" in the classroom, so that they find it more important to focus on planning daily practice than on finding and using materials in the classroom. This is even so for teachers who are very committed to teaching science through practical strategies. It has also been seen that the use of resources indirectly reveals the priority that teachers give to science in general. Even so, studies by Díaz and Muñoz (2013), Franco-Mariscal (2018), or Maroto et al. (2008) have shown the multiple benefits these have when learning science in Primary and Secondary Education, to improve attitudes and get the pupils more involved in the activities.

Pedrinaci et al. (1994) and Urones and Sánchez-Barbudo (1997), among others, emphasize that, for nature field trip to be successful and for there to be quality learning, teachers must encourage their pupils to be active in their learning through activities of various types—manipulative, motor, intellectual, sensory, and so on. However, there stands out in the present study the passive role that the pupils were assigned during nature field trips, focused on them listening to expositions on the part of the teacher. This seems to be common when learning science in Primary and Secondary Education (Costillo et al., 2014; Cox-Petersen et al., 2003; Martín et al., 2015), although less so in educational field trips to natural environments (Tal et al., 2014).

The role given to the pupil is closely related to the methodological approach. The participants mainly used a traditional and expository method, with classes in which their pupils hardly participate, a result shared with similar research with prospective Secondary Education teachers in Spain (Costillo et al., 2014). This could be related to the difficulties that prospective Primary Education teachers have in correctly using an inquiry method, as noted by Aragüés et al. (2014) and Bogdan et al. (2017). Furthermore, although studies such as those by Gerde et al. (2018) and Oppermann et al. (2019) highlight that teachers have positive attitudes and high self-efficacy towards teaching science, in Spain and other countries has been observed that prospective and novice teachers scarce interest in

science, their conception of the difficulty of scientific content, the lack of confidence when teaching science, and low positive attitudes towards science in general makes many of them reluctant to teach science, so it is not habitual they do activities using active methods (Abell & Roth, 1992; Avraamidou, 2014; Davis et al., 2006; Mazas & Bravo, 2018; Van Aalderen-Smeets et al., 2011). Keeping these facts in mind, active and child-center learning should be encouraged. Some studies from other countries as Finland or the United States have shown that child-centered pedagogical approaches promote later school success (Marcon, 2002), improve educational quality (Pianta et al., 2005) and has positive effects on the interest (Lerkkanen et al., 2012) and on their self-efficacy of the child (Golbeck, 2002).

With regard to the integration of field trips into classroom programs, the results show that there were few nature field trips designed by the prospective teachers which were related to the work done in the classroom. These data coincide with previous studies by Griffin and Symington (1997) and by Guisasola and Morentin (2009), who analyzed prospective Primary Education teachers, but not with those by Costillo et al. (2014) in which most of the preservice Secondary Education teachers analyzed combine the activities carried out in the natural environment with those that take place in the classroom. It is important to highlight the relevance of doing activities that connect classes with field trips, because as Kızıltaş and Sak (2018) observed, this can help to the development of students' social and emotional skills.

Knowing that prospective teachers tend to imitate with their pupils the scientific training they themselves received years before from their own teachers (Mellado, 1996), that past experiences can influence current activities following Rogoff's theory of participatory appropriation (Rogoff, 1990) and that our participants had no formal knowledge about nature field trips, our findings make sense. It also points to something that has been known for years and that coincides with the present results: in Spain, practical work, such as nature field trips, is used by only a third of teachers of the compulsory education stages, whereas in United States around half of Primary and Secondary Education teachers carry out field trips and in Denmark the majority of the Secondary Education teachers carry through at least one nature field trip a year (Braus & Champeau, 1994; Del Toro & Morcillo, 2011; Sanmartí, 2002). For this reason, our prospective teachers often have no such previous experiences to imitate, and not always know how to carry them out correctly to make them more productive for student learning, which highlights the need to implement nature field trips in teacher training.

5 | CONCLUSIONS

As far as we know, and coinciding with Jung and Tonso (2006), there has been no collection of data related to the appreciation of nature field trips within the initial training of ECE teachers. For this reason, the present research included an exhaustive analysis of 205 videos made by prospective ECE teachers, with the objective of providing new information about their conceptions of nature field trips. The results suggest that the practices which researchers have recommended for nature field trips do not coincide with what prospective teachers do or try to do since although many participants design nature field trips whereby they would carry out prepared activities and they would develop theoretical content and attitudes mainly, most of them showed difficulties to design suitable nature field trip for ECE pupils. Having in mind that our prospective teachers barely there was scientific formation until that moment, this result was expected, even if similar results had also been observed by Morag and Tal (2012) for in-service Primary Education teachers in Israel.

Also, most of the prospective teachers analyzed maintain a traditional view of this type of activity: focusing on developing conceptual content through an expository methodology. It is likely that the participants' lack of experience prevents them from giving their pupils greater freedom to inquire into and investigate the natural environment visited since, finding themselves in a different place from the classroom, they feel a need to control their pupils by using expository methods and “safe” activities (Appleton & Kindt, 2002).

The present research has provided evidence about the need to increase research in ECE science teaching to contribute to improving the teaching practice of in-service science teachers. It also highlights the need to strengthen the scientific training of prospective ECE teachers through reforms to the initial teacher education in university and to the planning of science curricula. This fact was emphasized by Anders (2014) who noted the need of support ECE teachers in a comprehensive and continuing way. With this study we want to collaborate in this tricky task, attempt to get that teachers arrive at the early childhood classroom with a greater and better knowledge of science, and that teachers be able to adapt the knowledge to the stage of education they are going to be working in, since it is not the first time that difficulties have been detected in designing productive practical activities, such as nature field trips, destined for the classroom of pupils from the ages of 3–6 years (Cantó-Doménech et al., 2017).

6 | IMPLICATIONS

The purpose of this study is to emphasize nature field trips as appropriate and valuable pedagogical experiences in teacher training and ECE. Therefore, this study shows the strengths and limitations of nature field trips proposed by more than 200 future ECE teachers, with the ultimate purpose of having teacher educators highlight nature field trips as valuable educational experiences for science teaching in ECE.

In addition, this study shows the difficulty of designing nature field trips for ECE children. This complex task is composed of many elements that future teachers must take into account when they design nature field trips (Kisiel, 2007), such as those analyzed in this study (topics, types of content, difficulties and/or errors, methodology, evaluation, etc.). Authors want to encourage teacher trainers to teach prospective teachers about nature field trips. Previous studies reported insufficient or lack of teacher preparation to carry out outdoor activities, and that can implicate teachers insufficient belief in themselves to develop field trips (Carrier et al., 2013; Hyseni Spahiu et al., 2014; Lindemann-Matthies et al., 2011).

As Glackin (2016) suggested, and thank to findings of this study, teacher trainers can know the aspects in which future teachers need more training and support, which will help improve their lessons on pedagogical experiences in natural environments. This can promote and increase higher quality science teaching in ECE.

From experience gained in this study, we recommend teacher educators conduct pedagogically driven nature field trips with prospective teachers so that they experience this type of practice, and they can replicate it easily with their future students.

7 | LIMITATIONS

Some limitations of the present study have to be mentioned. While this study provides potentially valuable insights into the complexities of nature field trips designed by prospective teachers, our investigation is that our study was not longitudinal. It will be really interesting to observe how prospective ECE teachers develop their teacher practice after do the subject or even after to do a nature field trip in the subject with prospective teachers as students.

Finally, although we count with a large sample in this study, this was limited by the number of enrolled students every year in this university. Also, this study can be more objective if it was replicated with prospective science teachers at other stages or with future teachers from other countries with the purpose of have an international point of view.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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