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D5.1 EOC ACCREDITATION IN EUROPE: A MAPPING STUDY

Project acronym: OTTER

Project title: Outdoor Science Education for a Sustainable Future

Call: H2020-SwafS-2018-2020

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List of Acronyms

AAA	Adventure Activity Associates
AAIAC	Adventure Activities Industry Advisory Committee
AEE	Association for Experiential Education
AET	Award in Education and Training
CEVAS	Countryside Educational Visits Accreditation Scheme
CLOtC	Council for Learning Outside the Classroom
D#	Deliverable
ECSITE	European Network of Science Centres and Museums
EOC	Education outside the classroom
ERIC	Education Resources Information Center
EPA	Expedition Providers' Association
EQF	European Qualifications Framework
LEAF	Linking Environment and Farming
LOtC	Learning Outside the Classroom Quality Badge
NGO	Non-governmental organization
NQF	EQF-based National Qualifications Framework
OSSEIS	Out-of-school science education institutions
RVAC	Recognition, Validation, Certification, and Accreditation
RVCC	Recognition, validation, and certification of competencies
SAS	Self-assessment study
STEAM	Science, Technology, Engineering, Arts and Mathematics
STEM	Science, Technology, Engineering and Mathematics
STF	School Travel Forum
WP#	Work Package

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OTTER project

OTTER is a H2020 funded project that aims to **enhance the understanding of Education Outside the Classroom** (EOC) **methods and pedagogies** and how they can help to **improve the acquisition of scientific knowledge and transferable skills in students**, **specifically in the field of environmental sustainability and the reduction of plastic waste**. It aims to increase interest in scientific topics among young people, while also contributing to the range of innovative educational projects and the increase of scientific citizenship within the EU.

OTTER aims to strengthen educational outside-the-classroom (EOC) **networks within Europe**, connecting experts from four different regions within the continent (**Finland, Hungary, Ireland, and Spain**). The strengthening of these networks will be utilised to carry out a programme of EOC pilot schemes and analysis of the effect they have on the performance of participating students, including their levels of sophisticated consumption and scientific citizenship, to increase understanding of the effects of education outside the classroom on EU citizens. The pilot schemes will share a common theme revolving around issues of plastic waste and recycling to build upon recent momentum in tackling related global educational, social, and environmental issues and due to the close relationship between reducing plastic waste and the need for more sophisticated consumers.

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Project Consortium

GEONARDO STATE OF THE ART AND BEYOND	Geonardo Environmental Technologies **(GEO)**
SCIENCE CONNECT European Science Foundation YOUR PARTNER IN SCIENCE	European Science Foundation **(ESF)**
university of groningen	University of Groningen **(RUG)**
UNIVERSITY OF LIMERICK OLLSCOIL LUIMNIGH	University of Limerick **(UL)**
BRIDGEBUDAPEST	Bridge Budapest **(BB)**
Learning Scoop	Learning Scoop - oppimisen osuuskunta **(LS)**
Big Van Ciencia	The Big Van Theory **(TBVT)**
CARDET	Center for the Advancement of Research & Development in Educational Technology **(CARDET)**

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1. Executive Summary


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1.1 Objective

As the very first output of *WP5 Scattering knowledge and opportunities*, this report aims to map the field of education outside the classroom (EOC). This mapping aims to contribute to understanding how education outside the classroom is structured and how it occurs in practice in various contexts in Europe. We, therefore, intend to identify places, actions and educational programs that foster education outside the classroom (e.g., science festivals, science museums, science centres, research centres, planetariums, botanical gardens, media science, specific exhibits, specific events, specific educational programs, specific newspaper supplements on popular science issues, specific websites, specific mobile applications, etc.) as well as possible existing good practices. By conducting such a mapping, we provide possible ways to assess gaps and opportunities for introducing accreditation for education outside the classroom in the context of European countries.

1.1.1 Rationale

To achieve these goals, we conducted a mapping on three fronts. First, we present our two-way mapping of the field of out-of-classroom education in order to get a more comprehensive view of the field:

- *Practices to places* (in which we are mapping different types of EOC practices that are currently taking place and detailing the contexts in which they occur) and
- *Places to practices* (in which we are mapping different national sites with potential for EOC practices, but yet underdeveloped or not formalised).

Following this, we provide an overview of references on accreditation and explore some European models of recognition, validation, accreditation, and certification to describe possible pathways for accrediting education outside the classroom.

In this report, we will cover two key points for the OTTER project:

- To understand how the field of education outside the classroom is structured in terms of practices, processes and places.
- To explore recognition, validation, certification, and accreditation models that can contribute to the elaboration of an accreditation system for education outside the classroom in Europe.

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2. Introduction

2.1 Why map the EOC field, and how does this allow us to think of possible approaches to accredit EOC practices?

Science provides students with the tools they need to improve their comprehension of the world around them, and it is generally acknowledged that knowledge of science is crucial for young people. For primary, lower secondary, and upper secondary education, European nations may have a required or recommended scientific curriculum that includes learning objectives for pupils in STEAM material. These curricula operate as a framework for initial teacher training in many nations and assist in directing their work (Eurydice, 2007).

However, formal scientific education is the subject of critical scrutiny throughout Europe, where Biology, Chemistry, and Physics disciplines are still at the curriculum centre. According to Osborne and Dillon (2008), many students who need a thorough understanding of the essential concepts offered by science do not have their requirements met by this educational system. Additionally, the pedagogy and substance of such courses are contributing to unfavourable views about scientific education and failing to inspire young people to continue science studies (Sjøberg & Schreiner, 2012).

There is widespread agreement about the advantages of informal science education settings (Tisz et al., 2020). Additionally, some studies (Václavková, 2013; Stocklmayer, 2010) call for increased cooperation between informal education settings and formal education. With solely formal science education, whose curriculum is created to cover topics on standardized examinations exclusively, children may not experience science as "alive" or as stimulating as they may with science education methods taking place in informal settings (Smith et al., 2021).

In the majority of schools in Europe, formal education is still predominant, but integrating education outside the classroom is evolving as a possibility to achieve a more critical and comprehensive education (McCormack et al., 2022). Unfortunately, the proportion of teachers who exploit possibilities outside the classroom for their lessons is unclear. However, the interest in education outside the classroom is increasing in response to more critical education and the evidence that it helps students learn about various topics related to STEAM and develop multiple 21-st century skills (Education Outside the Classroom, 2005; McCormack et al., 2022).

The acceptance of learning outside the formal settings necessitates a structuration and re-examining of the processes of recognition, validation, accreditation, and certification in the field of education. Those procedures can ensure the quality of education and safety of youth during activities performed in the context of education outside the classroom. It is in this context that the mapping we are proposing is situated. Without a clear understanding of the practices and spaces in Europe used for education outside the classroom, it is not possible to engage in a debate about how we can accredit initiatives for this purpose (e.g., educational programs, informal learning settings, materials, and organizations).

Considering the theme of accreditation as the background for our mapping, we started from indicators previously defined in the context of the OTTER project consortium, which included: the degree to which EOC programs are aligned with specific curriculum standards, clearly defined learning outcomes, assessment processes to verify learning outcomes, quality and experience of EOC providers, qualifications of staff designing and implementing the activities, alignment with age level, school needs, and processes. In a previous assessment, we identified the challenge of using such

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indicators as categories for our mapping analysis, mainly due to the demand for more information. In this sense, we sought to map the field using more specific categories that could still communicate with such indicators, enabling us to capture a view of the field. For this reason, we also have organized our mapping on two fronts (Practices to Places and Places to Practices), seeking to broaden the sources of information and better map the gaps and opportunities for accreditation.

So far, specific mappings in this direction in the European context are still scarce in English. We also found no data of this nature about Europe in other languages, such as French, Portuguese, Romanian and Spanish. Although we did find some documents and studies to examine, they were prepared for other regions of the globe and had different scopes than ours. As an example, we cite some of these works below.

Bevan & Semper (2006) published a study in the context of the activities of the *Center for Informal Learning and Schools*, in the United States, to understand systemic structures and spaces for informal education and their contributions to science learning. The group's rich findings indicated that there is still a need for investment in establishing partnerships (e.g., between informal education spaces, schools, and the community) and professional development among the different actors involved in informal education.

Also, in the context of the United States, the *Center for Advancement of Informal Science Education* (CAISE) published a report on the field of informal science education and the inclusion of people with disabilities, aimed primarily at structuring actions for the future (Reich et al., 2010). The group explored informal science education practices (e.g., science museums, youth and community programs, and media and technology) carried out in the context of the United States. The document also explores a broad framework of inclusion based on the premise that inclusion should be physical, cognitive, and social dimensions.

We also found initiatives aiming to map spaces for education outside the classroom in Latin American countries and the Caribbean, particularly museums (see Massarani et al., 2015). We found a mapping focusing on accessibility describing museums as informal spaces for education but also for the context of Latin America and the Caribbean (see Rocha et al., 2017). However, both focused on museum practices (for a matter of scope) lacking a discussion of the curricular connections of these spaces.

Within the scope of accreditation studies, we did not find similar work focused on basic education. For this reason, we also present an overview on the topic at the end of this report.

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3. Mapping study: *Practices to places*

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3.1 Rationale and Methodology

In this mapping, we seek to capture relevant evidence to understand how the field of education outside the classroom is structured. We used the same (rigorous and transparent) techniques as systematic reviews in a systematic mapping. As opposed to systematic reviews, which aim to provide a solution to a particular issue, systematic mapping compiles, describes, and classifies any relevant information (such as primary, secondary, and theoretical data) on a specific subject or relevant question (James et al., 2016). The presented literature can highlight knowledge gaps and provide evidence for policy-relevant topics. Systematic mapping is particularly useful in cases where there are open questions that require consulting different sources of evidence to be understood, as happens in our case.

Accordingly, we followed the principles organised by James et al. (2016), which comprised the following steps: establishing the review team, setting the scope, setting inclusion criteria, protocol development, searching for evidence, screening evidence, coding, production of a systematic map database, describing and visualising the findings, report production, and supporting information.

The first part of our mapping starts with the results compiled in the D2.1 Literature Review and Compendium of Successful Practice. We proceeded from this list for three reasons:

1. The review considered empirical work and evidence on the role of out-of-classroom education in multiple dimensions of science education.
2. It included studies from the grey literature of the various consortium partner countries.
3. It included studies in the local languages of the partner countries (e.g., France, Hungary, Finland, and Spain).

The list was expanded by searching the Eric database (https://eric.ed.gov/) for new results using (i) keywords listed in the papers coming from D2.1 and (ii) keywords associated with the scope of our mapping. We proceeded this way to include other European countries and expand the potential of our mapping and, consequently, of our database. The keywords were: *out-of-school science learning, outdoor education program, environmental education program, citizen science, science exhibit, science event, science festival, media science, science field trip, ecology education farms, out-of-school science learning, environmental education program, science education programs, nature education, and science museum.*

Among the papers found in this phase, we considered only (i) empirical papers, (ii) those that described European contexts, and (iii) those that were available in open format. We discarded papers on higher education, theoretical papers and papers from countries outside Europe. The selected papers were then compiled into a database and analysed by the different authors of this report by searching for information about how out-of-classroom education activities and practices were being implemented. The 65 papers that met all these preconditions remained in our database. We summarised three main points for each paper: *the country, the place where the EOC activities were developed, and how EOC science activity was structured*. The list of these papers and their respective descriptions can be found in Appendix 1.

Based on this analysis, we compiled the information in matrices of presence and absence for the subsequent elaboration of syntheses through graphics. With the information available throughout the articles, we identified *spaces and places used for education outside the classroom*, *pedagogical approaches used*, *presence of activities for pre- and post-learning*, *duration of activities*, and *curricular contents*.

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3.2 Results

The 65 studies on EOC mapped in Europe were unequally distributed across countries (Figure 1). Finland concentrated on 14 studies alone, followed by Ireland (10), Germany (7), and England (6). These four countries accounted for more than half of the mapped studies. The remainder was distributed among ten countries, mainly Spain (five studies), Turkey, and France (4 each). Three other investigations were conducted in Denmark, 2 in Sweden and Greece, and only one in the remaining four countries (Estonia, Latvia, Slovenia, and Italy).

Finland and Ireland stand out for the significant number of studies on the subject, despite not being among the most populous countries on the continent. In contrast, it is striking that the subject has yet to be investigated with such emphasis in countries with extensive educational networks, such as Germany, England, Spain, France, Turkey, and Italy. In comparison with them and considering that several other European countries were left out of this list, it is positive that countries like Denmark, Greece, Sweden, Slovenia, Latvia, and Estonia already present studies on the subject.

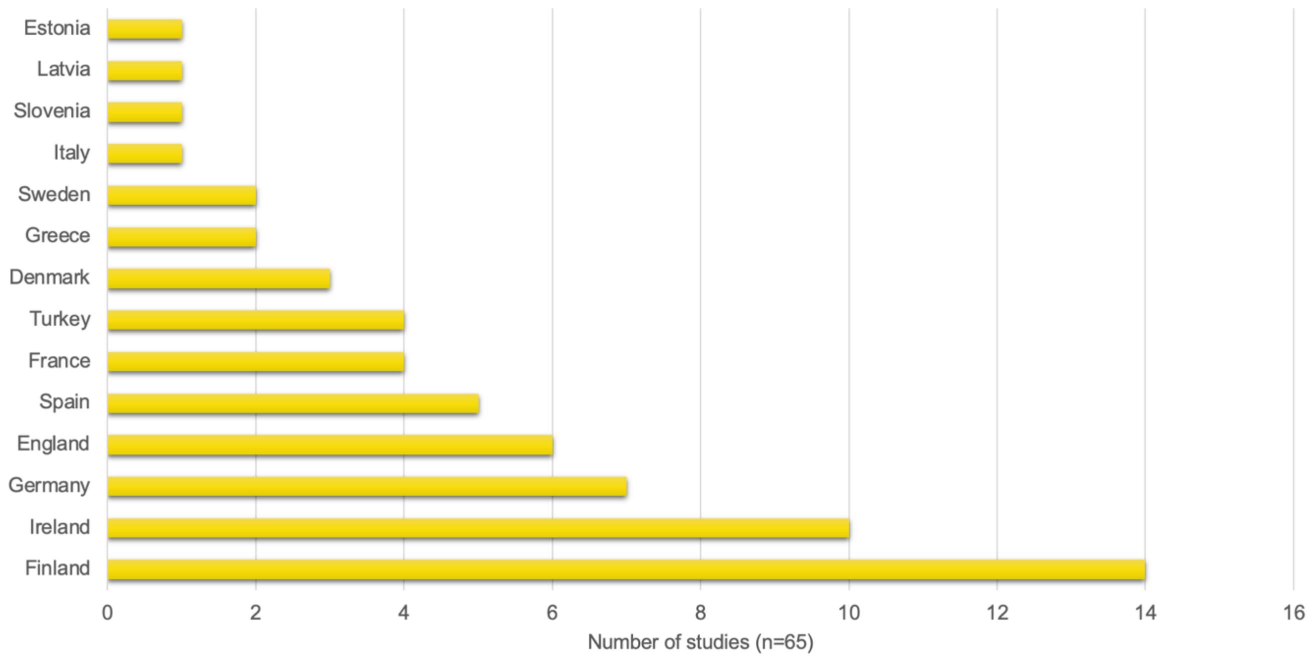

Figure 1: Studies on EOC according to the country

Another important data is that ten of the 14 countries in the mapped studies are in the "Level 3 of performance in Science" of PISA/OECD (2018). It is the second highest level and the most advanced is occupied in this area of knowledge only by China, represented by the provinces/municipalities of Beijing, Shanghai, Jiangsu and Zhejiang. Spain, Turkey, Italy and Greece are at level 2.
Eight other European countries, which had no study identified in this survey, also showed good scientific performance on PISA: Poland, the Netherlands, Belgium, the Czech Republic, Switzerland,

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Portugal, Norway and Austria. It is worth mentioning that, among these countries, Netherlands and Portugal "did not meet the PISA technical standards but were accepted as largely comparable" (OECD, 2018, p.7).

The following graph (Figure 2) shows the great diversity of spaces and places used for EOC: 27 different types were mapped in this inventory, with a wide variety within the categories as well. The OSSEIS (Out-of-school science education institutions), for example, include institutions such as museums, science centres, zoos and aquariums. In the mapping, studies on practices conducted in outdoor spaces such as parks and beaches (31), gardens and green areas (20), and farms (2) prevailed, representing more than half of the categorized places.

In second place were the spaces promoted by institutions specialized in popularizing scientific knowledge, either permanently, as in the OSSEIS, temporarily, as in science events and exhibitions, or in the form of educational programs (8 mapped studies had this defining characteristic). Finally, it is worth noting that several studies contemplated more than one space, place, or format used simultaneously, so the number above (103) significantly exceeds the number of mapped studies (65 publications by January 2023).

Figure 2: Studies according to spaces, initiatives, and places used for EOC

Figure 3 shows that the number of studies mapped (65) exceeds the number of didactic approaches for EOC identified (53), although several studies simultaneously presented more than one approach. In addition, it draws attention to the fact that almost 30% of the mapped studies did not explicitly employ a didactic approach, which, in an initial analysis, constitutes an important gap since these are studies related to science education.

Almost ⅓ of the occurrences belong to a single category (in which we gathered experiences described as "Hands-on", "Learning by doing", and "Maker education"). Another third was distributed between

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the practices of "Inquiry-based education" (11) and "Learning mediated by technology" (6). The remaining was distributed in a diverse range of approaches, among which the categories of gamification and "nature education" were notable, with four occurrences each, and "Student centred education", with three observations.

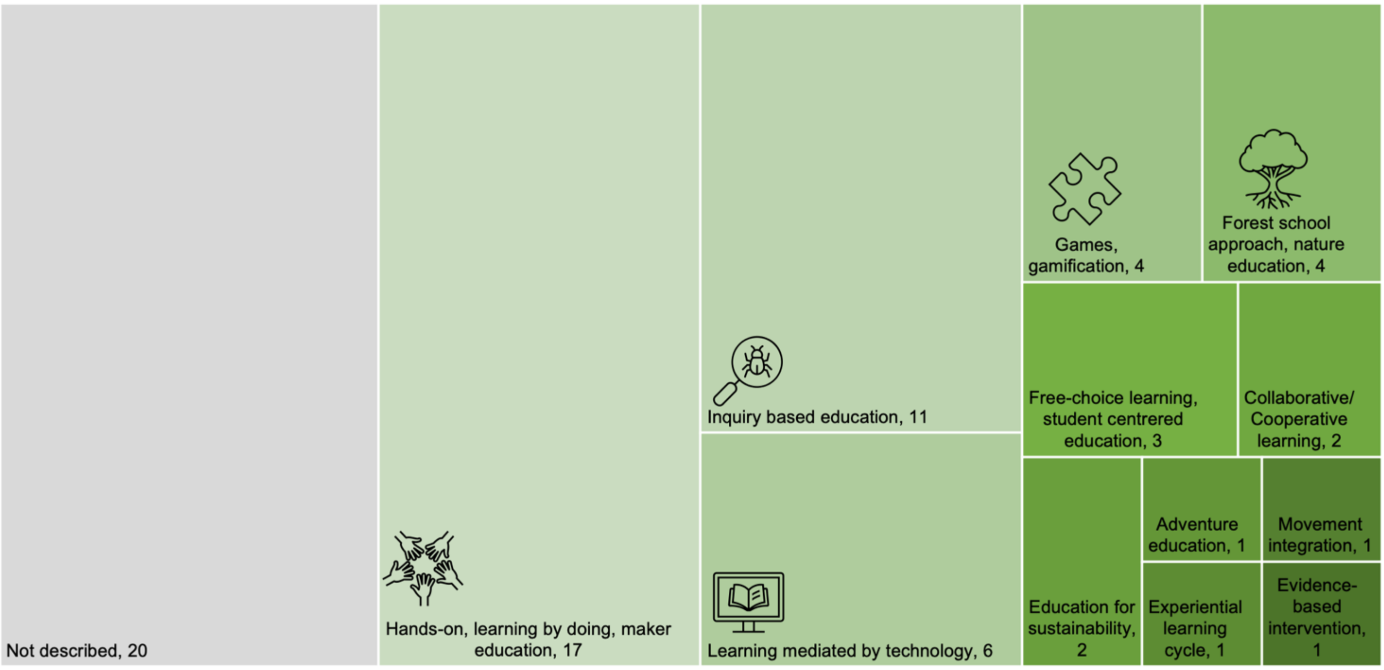

Figure 3: Studies according to pedagogic approaches or educational framework used for EOC activities

"Education for sustainability" and "Cooperative learning" appeared in two studies each, while the categories of "Adventure education," "Movement integration," "Experiential learning cycle," and "Evidence-based intervention" had only single observations. Concerning the studies that did not describe their didactic approach, it may be assumed (only as a hypothesis) that they were primarily distributed in the methodologies described above. The same may occur when considering "pre- and post-learning" strategies, as shown in Figure 4.

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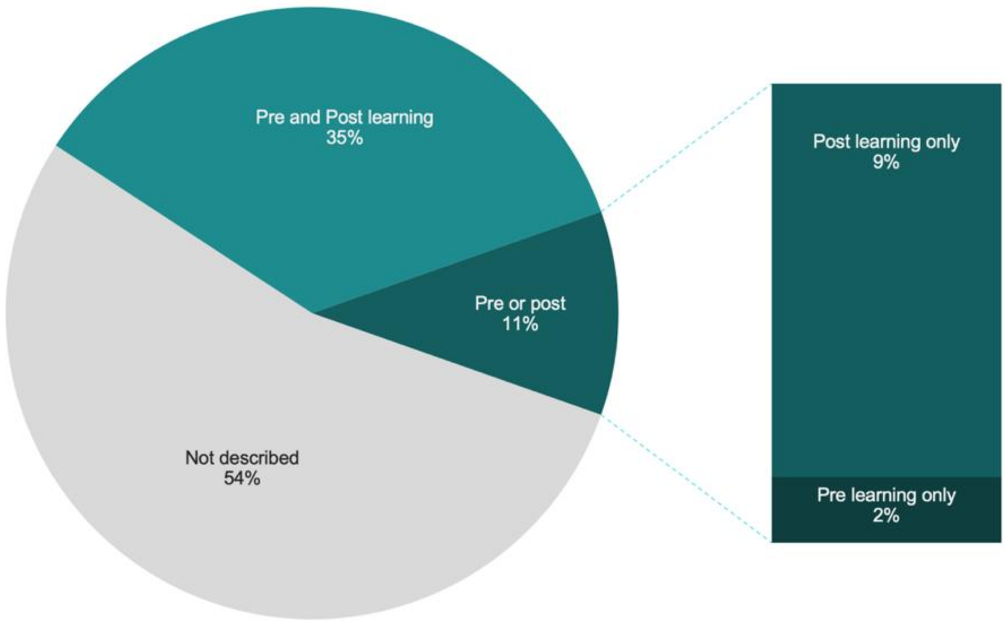

Figure 4: Studies including pre- and post-learning

The data in Figure 4 show that more than half of the studies analysed did not even refer to pre- and post-learning strategies. However, among those that did, ¾ used both simultaneously. Almost 20% of the sample used exclusively "Post learning" strategies, and less than 5% employed only "Pre learning" strategies. This is especially important when considering EOC-based activities of only one session, which represent ⅕ of the mapped studies, as shown in Figure 5.5.

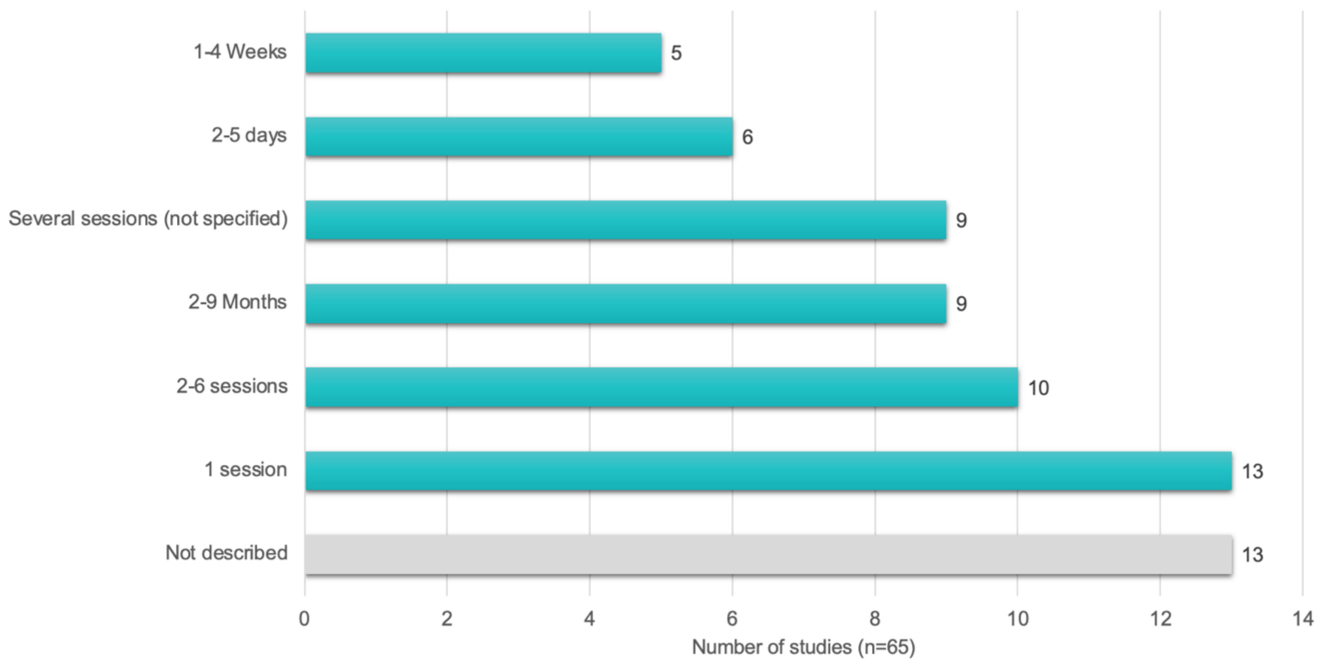

Figure 5: Studies according to time spent on EOC activities/programs

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In addition to the data already mentioned (of 20% of the studies including EOC activities lasting only one session), it should be noted that in another 20% of the amount analysed, the duration is not described, and in another 13.8%, it is not specified (although it is possible to identify that these are activities consisting of several sessions) (Figure 5). Therefore, ⅓ of the studies have a gap, total or partial, regarding the duration of programs and activities described, which is significant.

Short-duration activities (ranging from *2 sessions* or *2 days to 5 days* or *6 sessions*) accounted for almost 25% of the total mapped. That leaves just over 20% of the studies with longer duration practices, ranging from one to four weeks (5 occurrences) to 2 to 9 months (which was verified nine times among the studies analysed). An especially important highlight is that, among the EOC activities described, 75% are composed of multiple sessions.

Finally, Figure 6 presents the curricular contents covered by the mapped studies. The number of subjects and curriculum content covered during EOC activities is quite comprehensive, although there is an important concentration of them in the discipline of Biology, which represents almost 30% of the total occurrences. This may be related to the concentration of activities in outdoor environments, such as parks and beaches, gardens and green areas, and farms, as pointed out previously in Figure 2. Again, it is worth noting the number of studies that did not describe the contents covered by the practices analysed, this time at least in smaller numbers (10 studies out of 65).

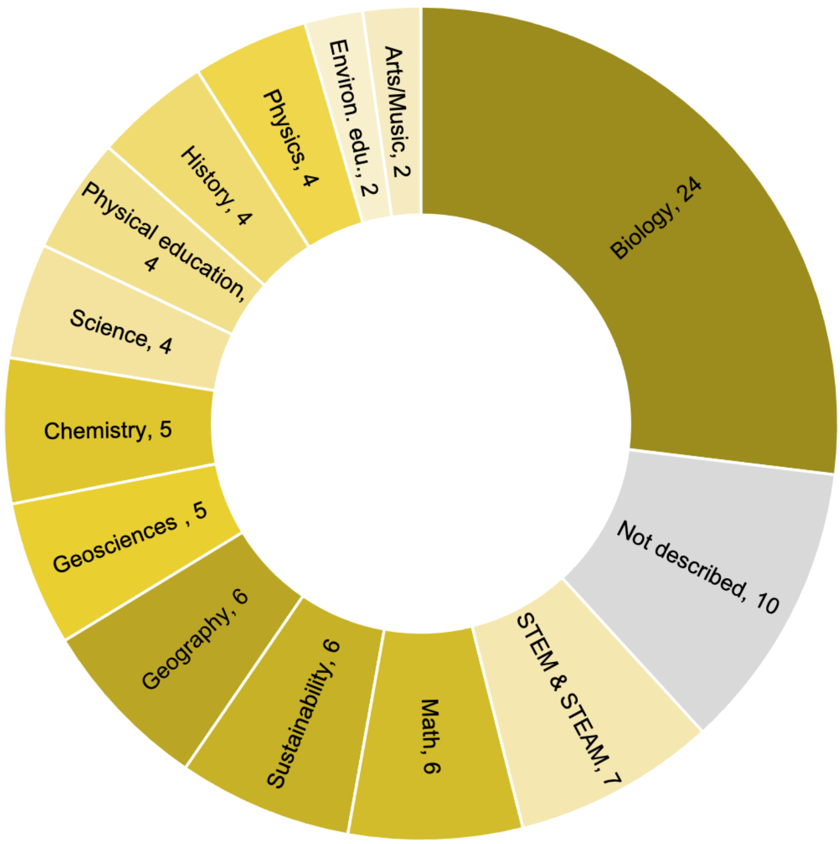

Figure 6: Studies according to curricular content covered during EOC activities

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One-third of the identified subjects are represented by STEM and STEAM (7 studies), mathematics, sustainability, and geography (6 each). The final third includes chemistry and geosciences (5 each); physics, history, science, and physical education (4 each); and environmental education and the arts, with only two observations each. This thematic classification sought to stick to the terminology adopted by the studies' authors but recognizes that there are several other ways to gather and categorize the same data.

These data extend the findings from D2.1 Literature Review and Compendium of Successful Practice since it included an active search for pedagogic approaches or educational frameworks already identified as facilitating the implementation of EOC activities. In summary, with the data we have mapped so far, we can expect that a typical EOC study will be conducted in a more northern European educational context (e.g., Finland and Ireland), involving outdoor activities (parks, beaches, green and open areas near the school environment), with hands-on activities, lasting from 1 to 6 sessions, on Biology, and adopting pre- and post-learning strategies. This may indicate that there is room for more diversity on all these fronts. It may also indicate that by publishing more on the subject, these countries may be doing more research, potentially helping to broaden the debate on effective ways to implement EOC.

Although inclusive and presents diverse data, our mapping has some limitations identified throughout analysing and synthesizing the data. We identified that works in Geography education (which also sometimes includes Geology or Geoscience and is treated as a separate subject in some curricula, such as in Spain and Ireland) also have rich literature, particularly on field trips. Searching actively for references in this line, also in Spanish, could have further enriched our mapping. Another limitation is in the language of the search. Due to the team involved in elaborating this document and its scope, we included mostly works published in English. Actively searching for new references in the national languages of the partner countries could also further enrich the data, better reflecting the reality of the EOC field in each partner country and complementing the data in the English language. Despite these limitations, the scope (e.g., it includes papers from different European countries), and the uniqueness of this mapping bring contributions to the OTTER project's subsequent actions and the literature on EOC.

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4. Mapping study: *Places to practices*

4.1 Rationale

As we have considered in the context of the OTTER project, EOC practices are curriculum-based programs in which primary and secondary school instructors move some of their instructional tasks from the classroom to locations beyond the school's walls (Blling et al., 2018). These EOC activities can be conducted inside research facilities, planetariums, museums, or natural settings like parks, botanical gardens, and beaches. According to Mygind et al. (2018) and McCormack et al. (2022), this approach engages all the senses and fosters learning, intellectual curiosity, physical exercise, social connections, problem-solving competencies, academic motivation, and mental wellness.

Although there is a growing body of research on the merits of current EOC practices, studies on the issues of safety, inclusivity, accessibility in spaces outside the classroom and covering academic subjects in those practices are scarce. Research and practice on these concerns will only be adequately framed with a clear overview of how EOC is happening in practice (Dawson, 2014; Tisza, 2020).

To address this issue, in this stage of our mapping study of EOC places and practices in Europe, we have emphasized a set of initiatives, including scientific fairs, science museums, planetariums, research facilities, farms, and media science. Through this comprehensive and systematic mapping, events that could offer EOC practices are also mapped and reported in this document. The goal was to comprehend how European EOC procedures included elements that matter for a future accreditation model, like child safety, inclusivity, accessibility, and correlation to STEAM curriculum content. These findings are contrasted and explored to provide an understanding of how EOC is structured and what it looks like in practice within diverse European contexts. In this sense, this report can contribute to a deeper understanding of the area and identify and assess gaps and possibilities for an accreditation model with potential consequences for educators and policymakers.

4.2 Methodology

To overcome the possible bias of mapping, only practices reported in academic papers and the natural gap from not including the practices happening in different multicultural contexts, we broaden the scope of our searches by also conducting an active pursuit of places, practices, and programs in each of the partner countries. Understanding EOC not just as a product but as a process, we recognize the diversity of places in which it can occur. In an attempt to map it as robustly as possible for each category of place, we identify the best approach to including a particular place in our database. This way, we start from other databases that have been previously built collectively and by experts.

This mapping was carried out in two stages. In the first stage, a list was created with places, initiatives and educational programs that offer EOC activities related to the STEAM curriculum. In the second stage, this list was shared experts (e.g., EOC academics and practitioners) who, in a validation process, could exclude, include or replace items. The list contained items from the OTTER consortium partner countries: Cyprus, France, Finland, Hungary, Ireland, Spain, and The Netherlands (Table 1).

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	First version of the database	Final database
Country	Number of items included in the first version of mapping list	Number of items after the validation by the experts
Cyprus	17	14
Finland	19	28
France	24	45
Hungary	20	21
Ireland	24	23
Spain	41	21
The Netherlands	31	35
Total	**176**	**187**

Table 1: Overview of the elaboration of the database

To create the first version of the list, we started with websites such as National Ministries of Education and/or Culture, NGOs and other Curriculum Providers, National Research Foundations with lists of funded projects and ERIC. We used as search words places and initiatives previously indicated as possible targets for this report: science festivals, science museums, science centres, research centres, planetariums, botanical gardens, media science, specific exhibitions, specific events, specific educational programs, specific newspaper supplements on popular science issues, specific websites, specific mobile applications, etc. Within the category of science museums are included science and technology museum, medical museum, technology museum, nautical museum, natural history museum, geological and mineralogy museum, and other thematic museums associated with science and technology subjects. For some of these categories, we departed from other databases previously built by other experts, as we present in the following.

For science museums and science centres, we considered the list from *International Science Center and Science Museum Day - ISCSMD* (https://www.iscsmd.org/map-2017/) as a starting point. Our decision was because there is no other official database for science museums in Europe until this date, and this list was promoted by the leading organization related to science engagement in Europe (ECSITE). Although inclusive, a limitation of this list is that it is constructed based on information from the users and disseminated as part of ECSITE activities, which may be restricted to particular groups.

For parks and protected areas, we considered an updated list from the United Nations list of national parks and protected areas (IUCN, 1990). Our justification for this is that parks and protected areas are considered tourist attractions that receive more funding and, therefore, may have more facilities related to education, learning activities and accessibility. For gardens and botanical gardens, we considered the *Botanical Gardens Conservation International tool* since the list includes places of scientific and tourist interest (https://tools.bgci.org/garden_search.php). The main limitation of these two lists is that they consider parks and gardens on a national level, so areas of local/regional importance may be left out.

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Due to the scope of this report, places, programs, and initiatives in which we could verify evidence that a site/initiative/program has some curricular/educational concerns were included in the list for the step of analysis (e.g., the site says it receives students from schools, has monitors, organizes/has activities for schools, etc.).

The second stage of our mapping addressed some of the limitations we pointed out since it consisted of sharing the list with experts in different countries so that they could evaluate it and propose modifications based on their expertise in EOC. For this step, we indicated that the items should be evaluated according to three criteria and that those items that met at least two of the three criteria should be kept to the list:

1. EOC initiatives have generated good results and had a high impact. This can be verified by reports and/or information available to the public (e.g., on the website).
2. Practices that can be replicated or adapted with relative easiness. This means they have methodological descriptions or are accompanied by a publicly available framework.
3. Practices that create synergy between partners (e.g., schools and other stakeholders) and could be a source of inspiration and improvement.

Based on the final list (Appendix 2), the items were analysed using an evaluation form (Appendix 3). The information was all collected online between September/2022 and January/2023, considering the data available on the official websites of each of the initiatives, programs and places. However, due to the absence of information in more than 2/3 of the database (i.e., lack of quality information online), our evaluation was restricted to information that could also contribute to giving us an overview of the EOC field. Thus, the dimensions investigated in the end were (i) offering several languages, (ii) concerns with child safety, (iii) offering accessibility for wheelchairs, (iv) offering structure for hearing and/or sight-impaired children and (v) STEAM curriculum dialogue. The categories related to inclusion and accessibility (Table 2) were also based on references included in D2.1, such as the reference from Spain, *Evaluación de riesgos y beneficios del juego y aprendizaje al aire libre* (Assessment of risks and benefits of outdoor learning and play, Gil, 2016) and Finland *Leap into the Outdoor Classroom* (Laine et al., 2018).

Dimension	Description
Child safety	The place does not use physical, psychological and/or emotional objects/images (e.g., no images perceived as shocking to children, no access to dangerous animals).
Offering several languages	Offers at least one other language besides the national languages.
Offering a structure for hearing/sight impaired children	Offers resources for hearing/sight impaired children, or the site is accessible and advantageous to bring a companion.
Offering accessibility for wheelchairs	There are reduced mobility facilities for children and companions, such as elevators, restrooms, parking lots, circulation spaces, etc.

Table 2: Some examples of the categories included in the analysis

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4.3 Results

Figure 7 demonstrates the expressive diversity of existing EOC places, events, and programs within the countries participating in the analysis. However, it is important to note that despite the heterogeneity of the database, more than 30% are science museums, and 11.76% are science centres (totalling almost 45%). Adding the botanical gardens (21), educational programs (15) and planetariums (15), the mark of 70% of the total is exceeded. Another 15% are distributed among specific sites (11), farms (7), media science (4) and specific exhibits (2). The joint effort of the consortium partners has resulted in a rich database, whose items can be visualized in Appendix 2.

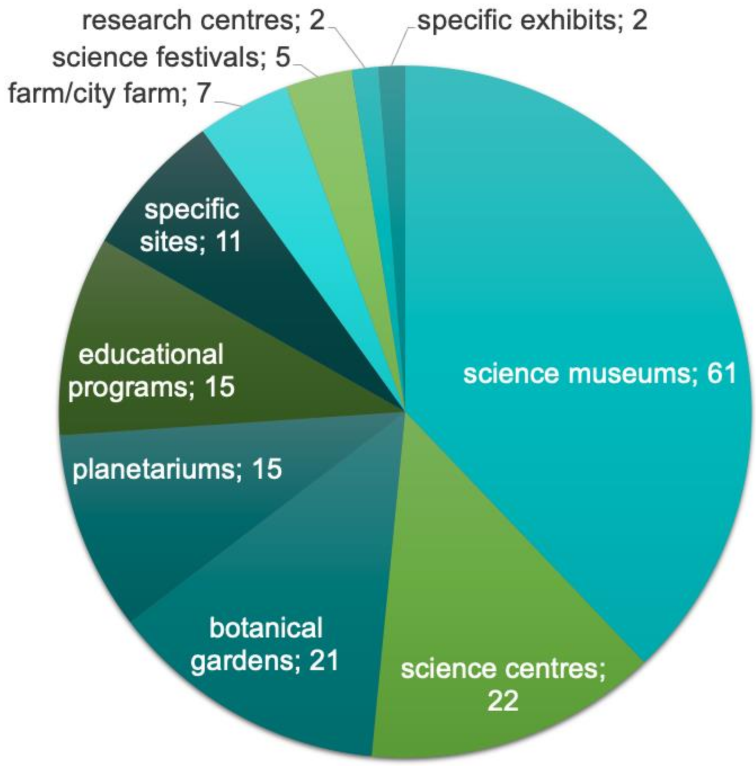

Figure 7: Places, events and programs for EOC practices in the OTTER partner countries.

As a broad and diverse database, we also offered a part of it as an interactive and open-access Google Maps (Figure 8). As one of the outputs of this mapping, it can be accessed (and potentially enriched) by participants of the OTTER project activities as well as be explored by others interested in identifying spaces and initiatives that can contribute to the implementation of EOC activities in the project partner countries. Available through the link bellow:

http://bit.ly/40mDHbg

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By creating this map, we also want to facilitate access to additional information that can be obtained through the use of Google Maps, especially since there are no official international databases for the information we are covering in the mapping. Therefore, our choice is also justified by:

- The possibility of using the algorithm based on a specific location as a filter
- The tool is enriched by an algorithm based on information provided by users, who are also the public interested in visiting these places
- This is a globally used tool and can also be a search source for EOC stakeholders, like educators and practitioners.

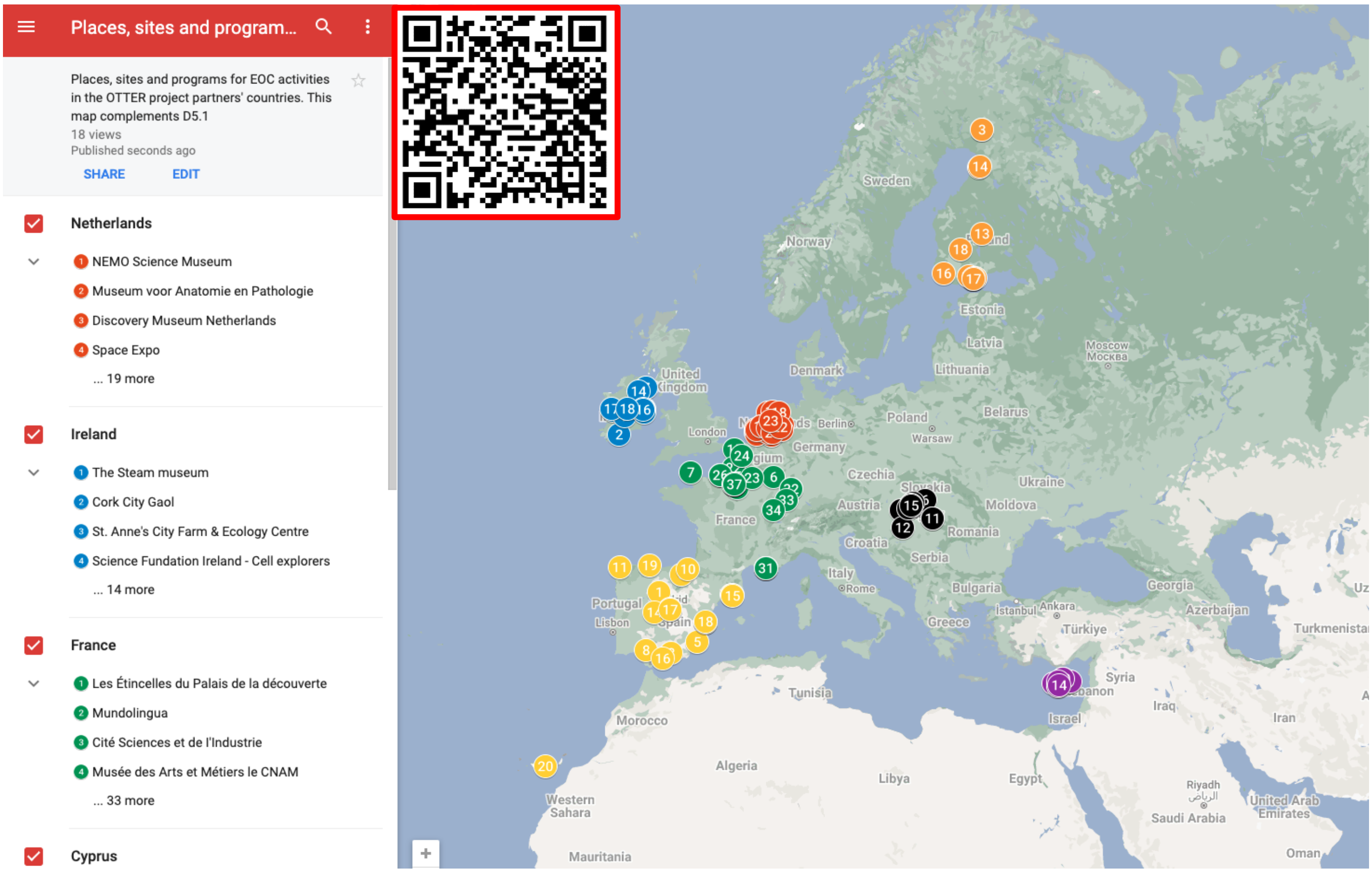

Figure 8: Print of the interactive map created based on this study

Other essential dimensions focused on in this mapping, mainly since we are concerned about EOC settings, are safety, inclusion, and accessibility. From the available online information, we tried to identify the existing mechanisms to guarantee the complete use of these spaces by people in the most diverse conditions. However, as Figure 9 shows, in most cases, the related information is not accessible on the Internet.

For example, the presence of "Multiple languages" can help families and students who have not yet mastered the local language, such as refugee families, to understand the content offered. In addition, the "Structure for hearing and/or visually impaired children" is fundamental for youth and the public also involved in education outside the classroom (e.g., teachers, educators), just as the "Wheelchair" - fundamental for people with physical disabilities or reduced mobility.

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Figure 9 also shows that the most accessible information is "Wheelchair accessibility". In second place are "Multiple languages" and "Structure for hearing and/or visually impaired children". Finally, we find data about the safety of children's spaces. When analysed from the perspective of an educational-orientated project, the absence of accessibility features has a clear curricular impact, as it alienates part of the public from a whole experience and undermines the experience of all visitors, as they are in a less diverse environment.

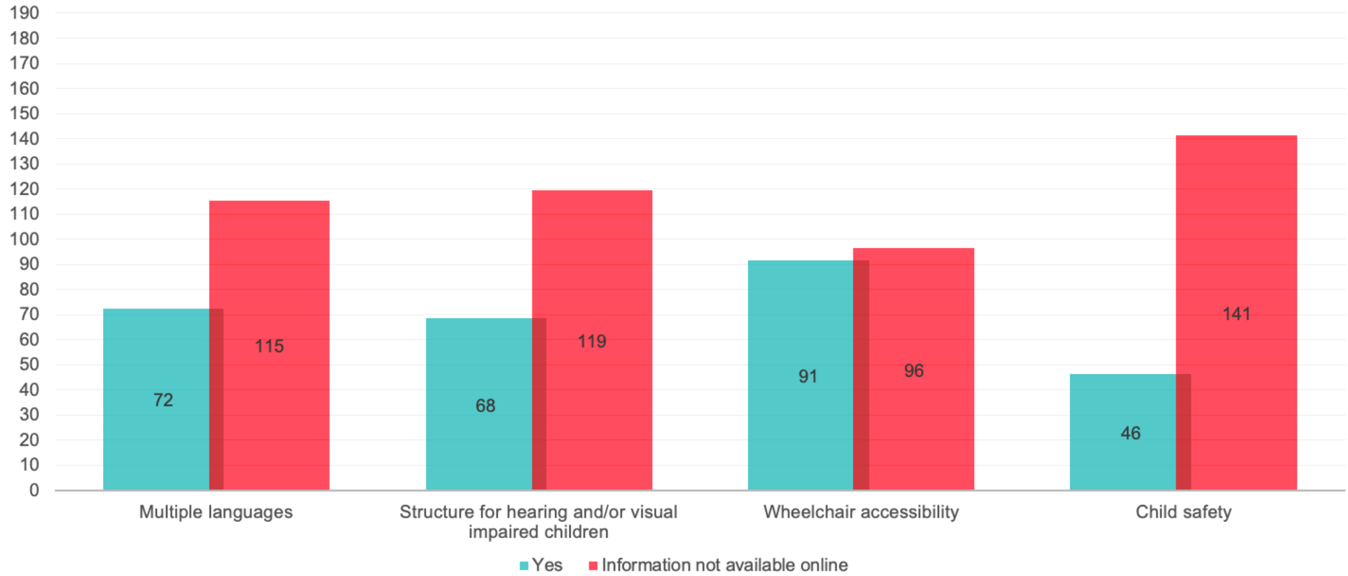

Figure 9: Safety, inclusion and accessibility in places, events and programs for EOC activities in the partner countries

Next, we analyse the presence of these accessibility resources according to the types of places, events, and EOC programs (Figure 10). It is observed that, among the places whose accessibility features are described on their websites, "science museums" have the most suitable structures for different audiences. Almost half of the 32.62% mapped sample maintain appropriate visitation conditions for wheelchair users. It is important to note that this criterion is not applicable in some of the selected places, events and programs (such as "media science").

The planetariums also stand out in this dimension if we consider the number of places analysed (15) compared to the other categories. The exception is for the existence of "Structure for hearing and/or visually impaired children", a criterion in which they score below average - probably due to the type of experience they have historically specialized in providing. Finally, in the sequence come the botanical gardens, with almost half of the analysed units having information available online about their accessibility resources (except for "child safety" devices), which places them ahead in this dimension of the science centres, for example, despite having almost the same number of units analysed.

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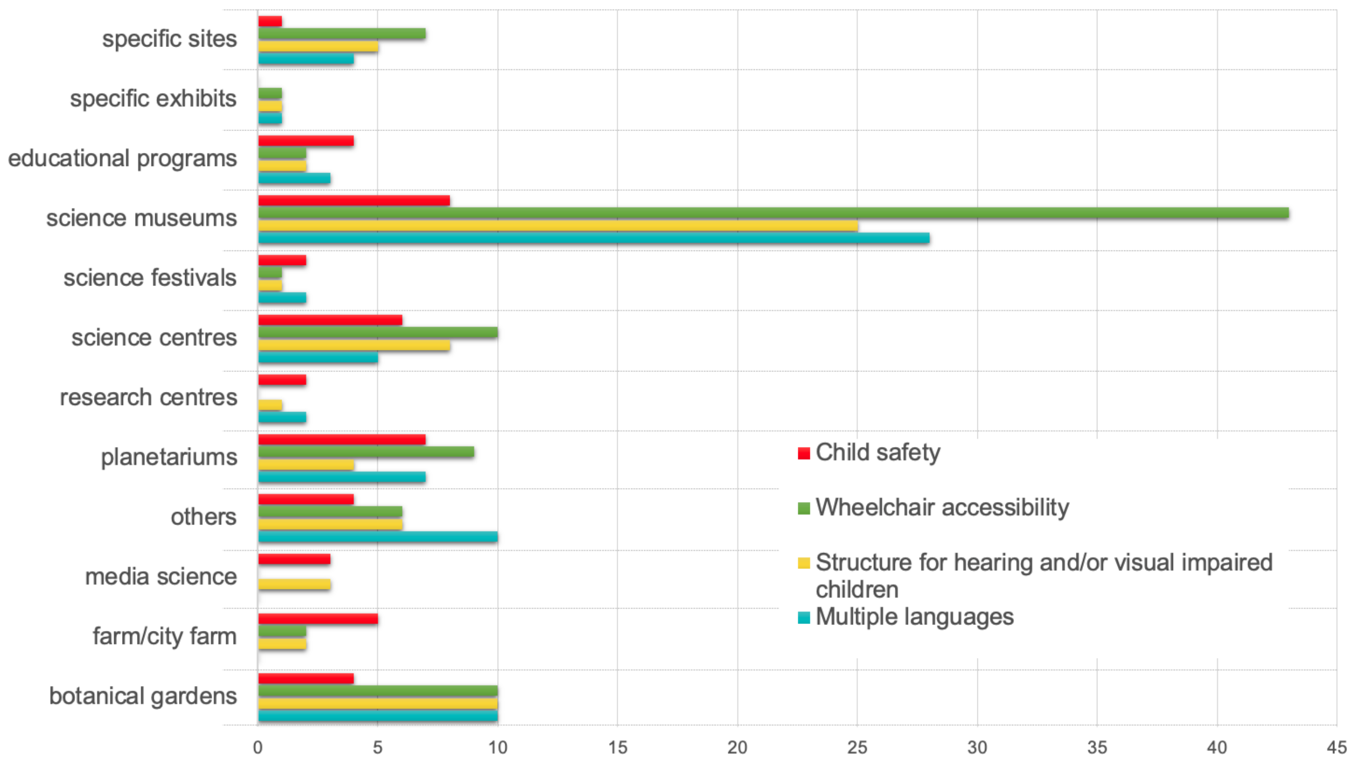

Figure 10: Safety, inclusion and accessibility according to places, events and programs

By presenting the predominance of content related to the biology curriculum in "places, events and programs for EOC activities in the partner countries" (in 72% of the occurrences), Figure 11 to some extent corroborates the data already commented in Figure 6 (which diagnosed the preponderance of biology contents in the mapped EOC studies). In line with these results, STEAM, Sustainability, Physics, and Chemistry likewise appear well-positioned in both parts of our mapping.

This data also illustrates an interdisciplinary trend of these spaces since the curricular content observed on their official websites significantly exceeds the total of initiatives analysed. More detailed data about curricular contents are presented in graphs in Figure 12.

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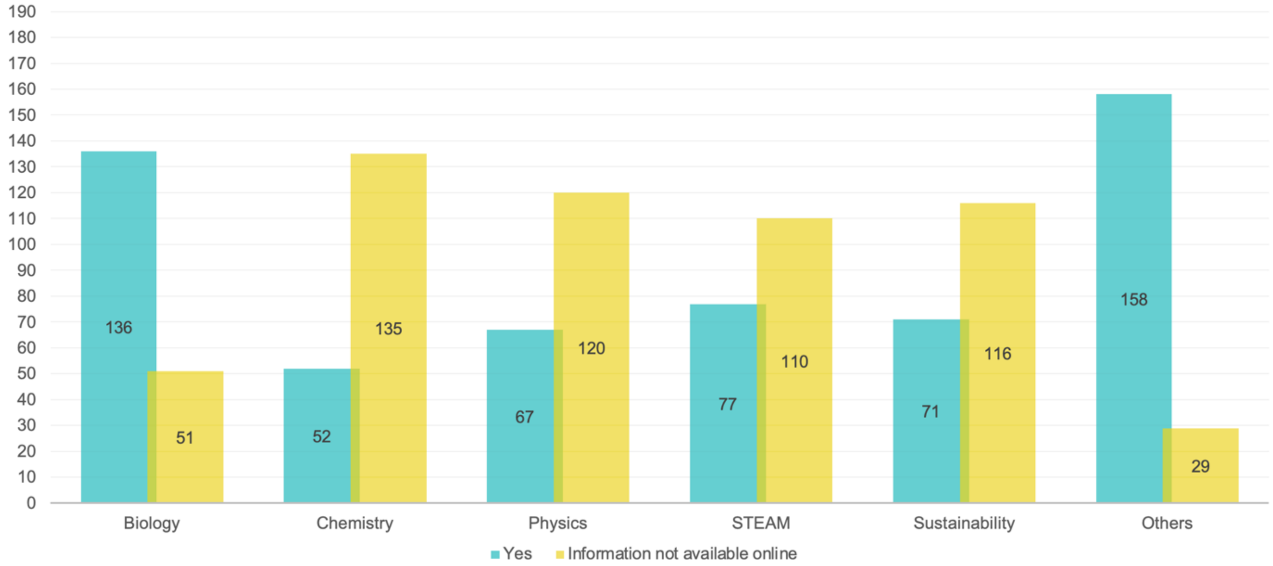

Figure 11: Online information about curricular contents in places, events and programs for EOC activities in the partner countries

In Figure 12, it can be observed that science museums are the most complete in terms of curricular demands. Possibly this is due to the more generalist characteristic of these institutions, which cover a wide range of subjects. Not infrequently, they have multiple environments, each of them devoted with more emphasis to one of the areas listed above. The heterogeneity of subjects covered by these spaces is difficult to reproduce in other contexts, which are generally more limited or have more specific thematic focuses.

This data also indicates the relevance of these institutions for learning outside the classroom since the specialists validated the items mapped, recognizing the importance of the educational practices carried out in these spaces. However, it is recognized as a limitation of this report the possibility of a bias in this data due to the number of museums analysed in the mapped studies, which exceeds all other categories covered. The importance for tourism and entertainment, and the vast field of study about these spaces can also explain this (UNESCO, 2021).

The science centres and the educational programs also stand out for the diversity of the curricular contents worked on when we consider the total number of units analysed (22 and 15, respectively). Other categories, by their characteristics and history, have more relevance in some specific topics, such as botanical gardens, which offer more possibilities for biology and sustainability, and planetariums, which stand out in STEM/STEAM and physics, although both categories also include several other curriculum connections.

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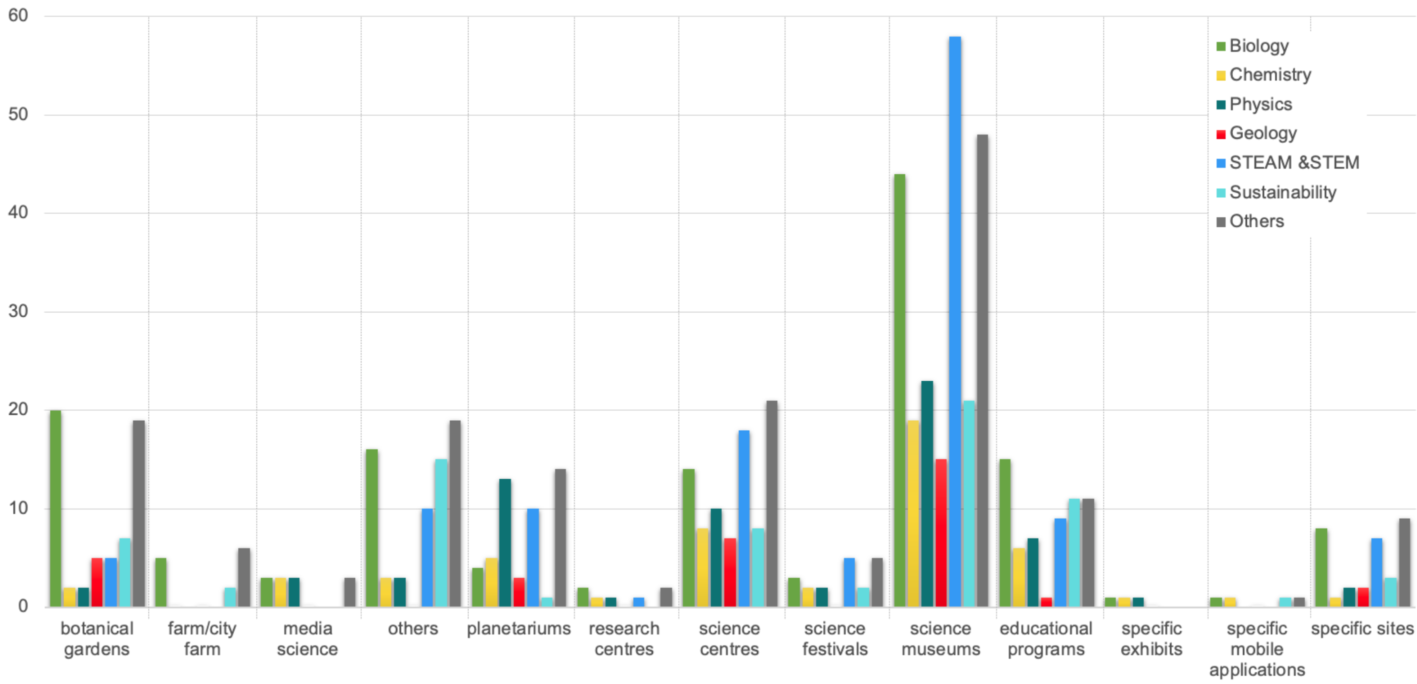

Figure 12: EOC contents according to places, events and programs for EOC activities in the partner countries

Given the OTTER goals, it is possible to infer that a more intensive dialogue between the contents available on the websites of these initiatives and the curricular connections foreseen in the national curricula can make them even more attractive to teachers, students and schools and also facilitate future accreditation processes aimed at making them more integrated into the education networks. Such data supports OTTER's proposal to systematize EOC strategies in order to enhance these spaces further and, at the same time, provide European students with a more meaningful and effective learning experience.

Regarding data gathering and findings, there are some restrictions in this mapping study. There is no database available with centralized information about museums and other spaces/initiatives for EOC in Europe, which means that our data collection could become incompatible with the workload for this report. Nevertheless, we tried to establish systematic criteria for surveying, organizing, and systematizing the information to constitute our database.

However, our approach does not incorporate the differences between countries' sizes or populations. As a result, our list may not capture (i) the diversity of the EOC field in each country and (ii) the main differences between the countries (e.g., more farms or museums in some countries). Additionally, during the data-gathering phase, it has not been possible to contact several events. As a result, information about the event's inclusion, accessibility, and safety could not be added to our database.

The results of this study are also constrained and cannot be immediately extrapolated outside of its boundaries. The goal, however, was to map and comprehend a broad field of education outside the classroom and explore the potential and limitations in the area rather than make generalizations. As there are no similar mappings to this one yet, we understand that this is an initial step towards discussions about the characteristics of these spaces/initiatives, the creation of a database with this kind of information and how to consider this information to accredit EOC practices.

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5. Gaps and opportunities for introducing EOC accreditation

5.1 Some conclusions from this mapping

Regarding the curriculum, we identified a predominance of biology content, student-centred pedagogical approaches implemented in multiple sessions, and EOC activities in parks and museums. We also identified a significant gap in information on:

- The degree of curriculum alignment of EOC programs with country-specific curriculum parameters,
- The learning assessment processes,
- The professional qualifications of staff involved in EOC initiatives, and
- The children's school needs in terms of accessibility, inclusion, and safety.

Nevertheless, the variety of mapped practices can contribute to advancing discussions about good EOC practices and thinking about ways to accredit EOC. In addition, our mapping has indicated that possible paths to accreditation will also need to consider the specifics of the locations where EOC occurs. In this sense, we have put together some models that already operate for particular contexts to consider in the context of WP5 how the OTTER project will contribute to this conversation.

5.2 Recognition, Validation, Certification, and Accreditation

According to UNESCO:

> Recognition is a process of granting official status to learning outcomes and/or competences, which can lead to the acknowledgement of their value in society. Validation is the confirmation by an approved body that learning outcomes or competences acquired by an individual have been assessed against reference points or standards through pre-defined assessment methodologies. Accreditation is a process by which an approved body, on the basis of assessment of learning outcomes and/or competences according to different purposes and methods, awards qualifications (certificates, diplomas or titles), or grants equivalences, credit units or exemptions, or issues documents such as portfolios of competences. In some cases, the term accreditation applies to the evaluation of the quality of an institution or a programme (UNESCO, 2012).

Since accreditation is the only form of approval of institutions or programmes according to UNESCO, we use this word to describe the process that values institutions and programmes in this report.

5.2.1 Some examples of lifelong learning accreditation in Europe

Significant regional differences exist in the world's non-formal and informal education recognition, validation, accreditation, and certification (RVAC). Due to the lack of a general education system, some countries emphasize general learning while others emphasize the RVAC of specialized skills required for employment. In Europe, national qualifications are converted into a general construction using the *European Qualifications Framework* (EQF). This enables the comparison of credentials from various nations. The implementation of the EQF involves certain additional countries as well as the members of the European Union. The *European Training Foundation* (ETF) based in Torino (Italy) and the *European Centre for the Development of Vocational Training* (Cedefop), based in Thessaloniki (Greece) are EU organizations involved in the EQF implementation process together

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with European Agencies. Countries that use this system adhere to their own *EQF-based National Qualifications Framework* (NQF) (The European Qualifications Framework, n.d.; Cedefop, 2019). Based on Singh and Duvekot (2018), we summarize some differences between each NQF; the following are a few examples related to lifelong learning.

To be eligible to take a final test, candidates in the Czech Republic can get partial credentials. An authorized individual who satisfies the requirements by law provides this partial qualification. Most of these individuals work for sectoral organizations, businesses, or public or private schools. In some instances, sectoral organizations use their certification procedures to certify individuals with professional experience. In Denmark, only educational institutions can validate informal and non-formal learning. The criteria are therefore established under formal education. The awarding of certifications is based on evaluating a tool or process such as a portfolio, interview, demonstration, test, or self-evaluation.

Non-formal and informal learning were included in the NQF in Finland by a committee comprising representatives from the Ministry of Education, the Finnish National Board of Education, Rectors' Councils, social partners, student organizations, and other stakeholders. In Finland, non-formal and informal learning is recognized based on competency. The evaluation consists of a self-assessment and a competency-based test to demonstrate that the candidate possesses the necessary abilities. The Finnish National Board of Education determines an applicant's suitability for a competency-based qualification. In France, the Ministry of Education is primarily responsible for recognizing past learning. The validation procedure, which involves applying a portfolio based on prior experience and evidence, was made better with the help of research. Additionally, there is an interview where the applicants must demonstrate how they acquired their knowledge and skills.

In the Netherlands, acceptance into another educational program serves as the primary criterion for validating formal and non-formal education. An institution registered as a knowledge centre can validate prior learning for the public and private sectors. In this phase, the candidates are required to create a portfolio. The Norwegian Association for Adult Learning offers 37,000 courses for opportunities for lifelong learning in Norway. Norway is developing an NQF that will recognize informal and non-formal education differently than formal education. The interested parties would like to showcase experiential learning from the workplace. Legislation-based national systems exist to recognize non-formal and informal learning formally. Prior knowledge is evaluated through a conversation, a portfolio, or a mix of practice and an interview. The formal system is tied to validation, but this system is already outcome-based. In the workplace, a system must save a record of each employee's training, practice, and experience. Admission to upper secondary and exemption are made possible by the validation of non-formal and informal education.

Portugal uses various methods to validate learning because its secondary school enrollment rate is lower than the rest of Europe's (75% vs 28%). When the government intended to increase the number of individuals attending secondary school, this resulted in three different education models. The first is ongoing professional development, while the second focuses on students and adults while teaching the regular evening programs during the day. The third model is based on adult-specific social intervention techniques and pedagogical activities. It was observed that most students had prior training in informal and non-formal settings when taking basic-level *Award in Education and Training* (AET) courses. As a result, their training sessions were shortened. AET courses now emphasize the recognition, validation, and certification of competencies (RVCC) acquired through informal or non-formal learning. A business association, a professional training centre, a state school, a professional school, a local development organization, and a management centre were the initial RVCC

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institutions. These organizations awarded diplomas with the same weight as years 4, 6, and 9 of formal education. Changes were made when this system grew from six to 450 centres. To assist with the guidance and orientation phases, new experts were added to the teams of the current RVCC institutions. The rules were updated, self-evaluation methods were used, and a professional, dual, or partial certification could now be obtained. Improvements in administrative administration and financing models produced a process that all centres follow. Later, formal efforts that offered short-term training to identify critical competencies were introduced.

These examples show the diversity of paths and possibilities for accreditation, but do not specifically involve EOC. As we claim in this report, multiple elements must be present at adequate levels to guarantee that the learning results of EOC are positive. Regulations for health and safety are also necessary, as are adequate presentation, teachers, and coaching. Risk analyses are also already in place at some educational places. To streamline the current procedures, it is crucial to invest in national organizations that accredit EOC activities. Numerous formats can be used for risk assessment. However, even well-known companies with extensive risk assessments are occasionally not the best choice for schools because, in the eyes of the local authorities, they employ the improper format, and a fresh risk assessment would take too much time and money (House of Commons London, 2005).

5.3 Mapping out some accreditation models

Information about different accreditation programs/initiatives was gathered to explore some models already in practice. For this, places that offered science education activities (e.g., science museums, parks, forest schools, etc.) and the documents from the literature review we presented at the beginning of this report were checked, looking for any form of recognition, accreditation or validation related to EOC. We also searched the ERIC database for research, reports, and other documents about accreditation in Europe. To include an accreditation program in our internal database, it had to be an accreditation body for non-formal/informal educational places. Therefore, accreditation bodies accrediting people were not added to the database. Likewise, accrediting bodies solely accrediting schools were excluded if the accreditation was based on formal education. Each item included in our database was analysed according to the criteria in Table 3.

Information about three accreditation bodies was compared. The main categories of the comparison were *accreditation process, effective learning, information, learners needs, improvements, policy and procedures* and *safety*. These categories are based on the LOtC (Learning Outside the Classroom Quality Badge). Since this was the accreditation body with the most information, we used their guidelines to compare the other accreditation bodies. Information to make this comparison was obtained from the accreditation body's website.

During our study, we located numerous organizations; a list of them is in Appendix 4. In the following, we outline three of these accrediting bodies and provide baseline information about them.

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Information	Description
Name and website	
Type	E.g., Document, model, system/framework, report
Who proposed it?	Organization/ Institution / Authors
Is it an exclusive system for EOC?	Yes/No. Describe if not.
What are the requirements to be accredited?	Who/what type of institution can apply? What do these institutions need to have (e.g., number of activities/students, professionals with what background)?
How does the system work?	How often does it have to be renewed? What parameters are taken into consideration during the accreditation process? Are there tools/questionnaires available? Is there any payment? Who provides the accreditation? Are there any diagrams describing how the system works?
Are there institutions already accredited?	Y/N. Which ones? Webinks.
Other information about this system/model	Any other possible information/links that could help map gaps and opportunities for introducing EOC accreditation in Europe.

Table 3: Information collected for each accreditation source

5.3.1 Description of each accreditation body

Learning Outside the Classroom Quality Badge (LOtC)

The Council for Learning Outside the Classroom in the United Kingdom is responsible for the LOtC Quality Badge. The LOtC started in 2008, and in 2009 the first learning sites were accredited. The *Council for Learning Outside the Classroom* (CLOtC) took over the management of the accreditation processes two months after the first accreditation in 2009. The council consists of people working full time for LOtC. They have experience in teaching, safety, and health, teach about environmental education at a university level, have post-grad in outdoor education, used to be an outdoor instructor with a teaching degree, were headteachers of an EOC school etc. This accreditation body provides an extensive overview of requirements based on learning and safety for all types of learning outside the classroom. Quality badges can be obtained from different learning sites: museums, art galleries, farms, nature reserves, adventure centres or cathedrals. These learning sites are essential for LOtC since an important belief is that all children should be able to learn outside the classroom to get acquainted with art, heritage, culture, adventure and the natural world. The LOtC not only provides accreditation to the learning site but also focuses on supporting teachers and/or learning sites to provide education outside the classroom. The LOtC is also promoting the benefits of EOC (Council for Learning Outside the Classroom, 2022).

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Countryside Educational Visits Accreditation Scheme (CEVAS)

The CEVAS course in the United Kingdom leads to an accreditation, given by access to farms, which is a part of LEAF (Linking Environment and Farming) Education. LEAF started in 1991 with demonstrations on farm sites, inviting people to visit farms and gaining members. In 2019 LEAF launched 'LEAF Education Demonstration Schools'. This accreditation body is focused on farms that provide EOC, ensuring that educational and safety measurements are taken. Since LEAF started by promoting awareness about sustainable farming, the main aims of LEAF education focus on engaging, inspiring, and motivating young people to gain insight into food production, farming, and the environment. When a farm commits to a CEVAS course, it can follow educational and therapeutic routes. CEVAS provides tools, knowledge and practical guidance for farmers. During the two-day course, farmers submit a portfolio for accreditation. The CEVAS course is mainly used when a learning site is starting educational activities (CEVAS, 2022).

Association for Experiential Education (AEE)

The AEE started in 1972 in the United States, Florida. The AEE has three staff members, hundreds of volunteers, and 1900 members. Members of the AEE can be individuals and organisations and have access to several benefits, like experiential learning-related journals, books, publications, newsletters, events, etc. AEE gives accreditation to *Adventure & Outdoor Behavioural Healthcare Programs* that provide experiential learning. Programs that can be accredited can be wilderness adventure programs, colleges and universities outdoor programs, K-12 school programs, outdoor behavioural healthcare, youth programs, and corporate team building and training programs. The accreditation board consists of experienced teachers (with outdoor qualifications, lecturers, professors, outdoor educators, sports instructors, wilderness therapists etc.). A learning site needs to be in practice for at least one year before the application to AEE can start (AEE, 2022).

5.3.2 Comparison between LOtC, CEVAS and AEE

Accreditation process

The LOtC offers two routes. The first accreditation route is for learning sites with everyday experiences, like museums, art galleries and scientific centres, with everyday risks. The second accreditation route is for learning sites that offer activities requiring a specific skill set and technical knowledge. These include learning sites like farms, adventurous education, oversea expedition etc.

The accreditation of route one is valid for two years and costs £150. The learning sites complete a Self-Evaluation Form and are subject to a desktop audit. Several accredited learning sites are visited by a member of the *LOtC Quality Badge Assessment* team to check if the quality of the learning site is maintained. The accreditation of learning sites in route two is done by external agencies approved by CLOtC regarding safety. The assessment will be entirely done by one of these external bodies, costs and duration of the accreditation depend on the external agency. The learning sites need to meet at least the same quality criteria as those in route one.

The CLOtC assesses Farming and Countryside learning sites. For example, a farm should take route two if visitors have contact with the livestock or soil or if the visitors are actively involved in farming

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practices. If the learning site is accredited, the accreditation will be valid for two years, and each assessment costs £400. *Adventure Activities Industry Advisory Committee* assesses adventurous activities (AAIAC); it costs £955 (LOtC Application Form, 2022.) and lasts for two years. First, the learning site must fill out an application form. Then an assessment visit will occur, where the learning site can prove its quality and safety, preferably with an additional portfolio. Finally, if the assessment is completed, another online registration must be filled in to inform the accreditation body about their provision (LOtC Adventurous Activities and the Learning Outside the Classroom Quality Badge, 2022.).

Adventurous activities that are overseas or otherwise expedition-related are assessed by *Expedition Providers' Association (EPA). Adventure Activity Associates (AAA)* provides the accreditation process on behalf of EPA. Unfortunately, there is no clear information on the sites of both EPA and AAA with details of the application process (LOtC Accreditation for Activity Providers, 2022; LOtC Basic Information Document, 2022). The activities in the Natural Environment Sector are assessed by the CLOtC. Accreditation can be obtained via route one when fieldwork does not require extra safety measurements or specific knowledge. If route two needs to be followed, the first phase is to fill in an application form. After the application form is submitted, an on-site visit will be planned. Based on a portfolio that must be handed in and the site visit, the CLOtC offers advice, and when all criteria are met, and the £400 fee is paid, the learning site will be accredited for two years.

The *School Travel Forum* (STF) accredits tours, including study, sport, and cultural activities on behalf of the LOtC. These tours should include activities not solely covered by one of the accreditation bodies mentioned above. A learning site should contact the STF to start the accreditation process. The needed information will be sent to the learning site, and the first payment of the yearly fee needs to be made. Next, the membership manual is sent to the learning site, and the option to start the audit is now available. The self-audit form must be sent to the STF before the audit can occur. If the audit is successful, the learning site gains accreditation. Otherwise, the STF guides help the learning sites to fulfil all the requirements to get accredited (LOtC Become a Member, 2022).

The CEVAS training offers two available routes: a therapeutic route and an educational route. In this report, we focus on the educational route. During the first phase of the accreditation of the learning site, an introduction of preparations is taught. Marketing, learning opportunities on the learning site, health and safety and risk management are considered in this first phase. The second phase discusses the links between the national curriculum and food, farming, and the countryside. In the third phase of the CEVAS training, handling difficult questions, presentation skills and talking to pupils and teachers are reviewed. After the course, tutors will help the learning sites to compose a portfolio with valuable documents that will be submitted for accreditation (CEVAS, 2022).

The AEE has an accreditation process with multiple phases. During the first phase, the application is made by filling in an application form and paying. During the second phase, a self-assessment study (SAS) is done. The learning site ensures that all criteria in the manual of accreditation standards are met. After the application form is accepted, the learning site has two years to complete the SAS and plan a visit. During this visit, the council of AEE checks if the learning site meets the requirements. After the site visit, the accreditation council evaluates, and if all standards are met, the learning site will be granted accreditation for three or six years. If some criteria are not met yet, there is a possibility of granting initial conditional accreditation. This is only possible if the insufficiency can be corrected easily. If accreditation is denied, a learning site can re-apply (Davis et al., 2021).

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To maintain accreditation, annual reports need to be submitted, and an annual accreditation fee needs to be paid by the learning site. If a new activity is added to the learning site, the council needs to be informed, and a new SAS will be done. The council needs to be notified of significant events (significant internal changes and significant accidents) to maintain accreditation. Twelve months before the expiration of the accreditation, contact between the council and the learning site about continuing the accreditation takes place. Six months before the expiration, a SAS should be handed in. In the other years (without expiration of the accreditation), an annual report should be handed in. The continuing of accreditation can be three or six years, depending on the confidence in compliance (Davis et al., 2021).

Accreditation process: When we look at the overall accreditation process, there are similarities. All accreditation bodies expect a form of self-assessment and a visit before a learning site can be accredited. However, in the CEVAS course only, training is provided. There are also differences in maintaining the accreditation. Since the LOtC works with different bodies for accreditation, there are differences in length and costs of accreditation, with a renewal of the accreditation every one or two years. AEE provides accreditation for three or six years, even though the activities at the learning site are like those at the learning sites of LOtC. There is no information about the length of accreditation by the CEVAS training.

Effective learning

As stated before, LOtC provides an extensive overview of requirements. The LOtC describes that learning sites need a process to assist users in planning the learning experience effectively. According to the LOtC, this includes: clear communication on the roles and responsibilities of the visitor and the provider on the learning site, the learning site needs to agree on the learning objectives and offer activities related to these learning objectives, the learning site need to be able to handle diversity and inclusion issues and needs, the learning site needs to offer guidance, information or resources to the visitor regarding the preparation of the visit, assessments during the visit and follow-up to the visit (LOtC Quality Badge Route 1 Application Guidance, 2014).

Many of these requirements are mentioned by Access to Farms too. On the site, Access to Farms mentions the need for communication on the roles and responsibilities of the visitor and the provider. There is no information on the site about the learning objectives. However, a video about the CEVAS course mentions that the national curriculum and the link with possibilities on the farm are discussed during the course. This suggests that there is some supervision of the learning objectives. The same video mentions that it might be convenient to pre-visit the learning site for teachers and other adults and a follow-up visit to the school. It is not mentioned how the learning site could provide assessments during the visit and how this should be communicated. CEVAS does not mention that considering diversity, inclusion, and needs is an issue. However, they provide a second accreditation track for learning sites focusing on visitors with mental health issues (CEVAS, 2022).

The AEE provides a *Manual of Accreditation Standards for Adventure Programs* for members. Unfortunately, this document is not available online; however, there is a document with some requirements on the AEE site: *Commonly misunderstood or unmet accreditation standards*. Neither

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this document nor other documents provided further information about effective learning requirements except for AEE's general value of social justice and supporting people with different backgrounds (Funnell et al., 2021).

Effective learning: LOtC and CEVAS emphasize the importance of agreement on the distribution of teacher roles on the learning site and the visitors. Both LOtC and CEVAS mention that the learning site uses learning objectives or is aware of the opportunities within the curriculum. However, we have no detailed information about the requirements for CEVAS accreditation. We found no information about diversity and inclusion issues on the CEVAS website, except for track 2 accreditation, where CEVAS includes visitors with mental health issues. LOtC makes a clear statement on this subject in its application guidance, and AEE makes a statement about diversity on their website. The LOtC describes that communication before and after the visit is important to improve learning. This includes a possible extra visit before and/or after the visit to show the visiting teachers around and to discuss the visit afterwards with the visiting group. The same is mentioned in the CEVAS course. However, we found no information on the website of AEE.

Information

The LOtC requires clear communication between the learning site and the visitor. The information on promotional material needs to be fair. The learning site should display a complete and accurate description of its services. The learning site clearly states the costs of a visit and, if necessary, for each activity. The costs should be appropriate for the experience (LOtC Quality Badge Route 1 Application Guidance, 2014). The CEVAS course covers the communication between the learning site and visitors and marketing. Unfortunately, there is no specific information about this on the website.

The AEE provides a Manual of Accreditation Standards for Adventure Programs for members. This document is not available to us; however, there is a document with some requirements on the AEE site: *Commonly misunderstood or unmet accreditation standards*. This document stated that marketing should be clear, the activities should be described accurately, and the description should not contain misleading content (Funnell et al., 2021).

Information: Both LOtC and AEE require transparent and fair communication of the learning site. This includes an accurate description of the learning site and the activities. During the CEVAS training, attention goes to communication; however, there is no description on the website, so we do not know to what extent this is done. The LOtC expresses that the costs of the visit should be clearly communicated too and that these costs should be appropriate for the visit. We found no information on this topic on the CEVAS or AEE website.

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Learners needs

The LOtC describes that learning sites should offer various activities delivered through various teaching and learning styles. The variety should help visitors of different ages or knowledge levels progress in gaining knowledge. The quality of teaching should be at the same level in every session. The educational staff needs to be competent; proof of their teaching quality is required. At every learning site, the quality of equipment and facilities used by visitors are in good working order and safe to use. The location of the learning site is used effectively (LOtC Quality Badge Route 1 Application Guidance, 2014).

In the CEVAS training, time is spent on the differences between age groups. Therefore, we assume that this is a part of the portfolio that leads to the accreditation of a learning site; however, we could not check this (CEVAS, 2022).

The AEE provides a Manual of Accreditation Standards for Adventure Programs for members. This document is not available online; however, there is a document with some requirements on the AEE site: *Commonly misunderstood or unmet accreditation standards*. This document stated that staff requirements must be clearly documented and met by the staff. This includes skills required for teaching and specific activities like sports, as well as skills needed for specific groups.

Learners needs: The LOtC has the most extensive requirements regarding learners' needs. A learning site needs to offer well-educated teachers who use a variety of learning styles and activities. This should also contribute to the learning process of impaired visitors. This requirement is similar to the information we found about AEE and CEVAS; however, this information is not as clearly described. The LOtC also stresses that the quality of equipment and facilities should be good to provide for the learner's needs. This is mentioned regarding safety by the AEE and CEVAS and may be looked at differently compared to a LOtC inspection.

Improvements

The LOtC states that learning sites evaluate their services and that visitors give feedback on the planning, obtaining learning objectives, and if the value for money was achieved. The learning site should be able to act upon this feedback and self-assessment and have an appropriate practice in place to improve clear trends in the feedback (LOtC Quality Badge Route 1 Application Guidance, 2014).

The CEVAS training accredits the learning site for an unknown period. Two years after the accreditation, a CEVAS+ course can be followed. We found no information about self-assessment on the website and no information about a practice that should help improve the learning site. We found a recommendation for feedback from the school but no further recommendations or requirements for improvements based on feedback or self-assessment (CEVAS, 2022).

The AEE provides a Manual of Accreditation Standards for Adventure Programs for members. This document is not available online; however, there is a document with some requirements on the AEE

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site: *Commonly misunderstood or unmet accreditation standards*. This document stated that there should be a system to assess the staff's field skills, interpersonal skills, group skills, and job performances (Funnell et al., 2021). There are no recommendations on improvement in the documents we found on the website on improving the program in general, except for when a self-assessment study needs to be done (to maintain the accreditation). However, this document stated that feedback will be given on the accreditation standards and might, therefore, not be relevant to improvements later on (Outline of the AEE Accreditation Process Application, n.d.). Improvement is also not mentioned in the annual report form (AEE Annual Report Form, 2020).

Improvements: All three accreditation bodies recommend asking visitors for feedback to improve weak points during the visit. This is the only information about the improvement we found on the website. LOtC encourages learning sites to evaluate their service and to act upon it with appropriate practice. The AEE requires an evaluation with an additional focus on the (soft and hard) skills of the staff.

Policy and Procedures

According to the LOtC, the learning site needs to have a procedure in place to ensure that the staff on the learning site is updated on relevant information on the visitors. All practices related and unrelated to learning should be reviewed, maintained, and updated. Important written policies and procedures should be updated and available for all staff. To be accredited, it is necessary to show that these policies and procedures are in practice. There should be a policy dedicated to sustainability, and this has to be available for visitors to learn about the impact of their visit; it is also expected a high policy to ensure the quality of the complete learning site (or of all learning sites), all practices and activities and all staff members. The experience of new and revisiting visitors should be consistent; if staff is replaced to another site or another task at the site, the same quality should be delivered (LOtC Quality Badge Route 1 Application Guidance, 2014).

It is unclear how the CEVAS course pays attention to policies and procedures besides health and safety and risk management policies. For example, there is no information on the site about environmental policies and necessary documents for staff. There is also no information on how learning sites must keep quality continuous over time (CEVAS, 2022).

The AEE provides a Manual of Accreditation Standards for Adventure Programs for members. This document is not available online; however, there is a document with some requirements on the AEE site: *Commonly misunderstood or unmet accreditation standards*. This document stated that there should be a written crisis management plan. It also states that a system should be in place to check the appropriateness of a subcontractor's credentials and performance. The AEE expects learning sites to keep equipment at a continuous quality. A system should be in place to keep track of purchases, inspections, and equipment maintenance. We found no additional specific policies on sustainability and essential documents for staff (Funnell et al., 2021).

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Policy and Procedures: LOtC and AEE expect a background check on staff that works on the learning site. An additional check of the teaching abilities of the staff needs to be done. The LOtC states requirements for reviewing, updating and applying the procedures and the need for sustainability on the learning site. This is not seen in the AEE and the CEVAS course documents.

Safety

The LOtC states multiple requirements on safety, the first one being that procedures about safety should be in place to identify and manage the risks properly. These procedures should be known by the staff and reviewed regularly. The learning site needs signed forms of all relevant external regulations and insurance that cover the complete learning site. The visitors should be safe on the learning site, meaning protection from maltreatment, preventing impairment of health or development, and providing safe and effective care.

Documents on (child) protection policies should be read and understood by all staff regularly, and all staff need to be checked on suitability before they can start working on a learning site. If animals are kept on the learning site, these animals should be taken proper care of. If visitors have contact with these animals, hygiene facilities and clear instructions on hygiene must be available for visitors (LOtC Quality Badge Route 1 Application Guidance, 2014).

Access to farms and the CEVAS training refers to the code of practice. This document states that learning sites need to inform their visitors about safety and health risks and that it is reasonable to expect visitors to have a moderate degree of personal responsibility. The learning site needs to write safety policies and procedures and ensure that the staff knows how to implement these during a visit. Accidents and near misses need to be noted to improve policies and procedures. A continuous system should be in place to keep the policies and procedures appropriate.

The visitors should be protected against zoonotic risks and hazards like workplace transport and falling objects. The code of practice provides information on multiple zoonotic diseases and how to prevent visitors from getting harmed by these diseases. The risk assessment should include taking precautions to control the entire risk situation. A plan should be made to improve these situations, and a regular review must be done of these potentially dangerous areas. Clear statements on touch and no-touch areas should be present on learning sites. It must be considered that visitors might touch animals or objects even if this is forbidden; therefore, precautionary measures should be taken. To prevent contamination, it is necessary to put clear signs about the risks of eating, playing, and smoking in touch areas. Washing facilities are preferably located near the contact areas or at least on the route to eating areas. Contamination with faeces is prevented by double fences and visitors not being allowed to enter the pens. There should be taken good care of animals, the housing should be cleaned properly, and it is recommended to make a health plan with a vet. This plan should make sure that risks with animals are minimised (Industry Code of Practice, 2021).

AEE provides *a Manual of Accreditation Standards for Adventure Programs* for members. This document is not available online; however, there is a document with some requirements on the AEE

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site: *Commonly misunderstood or unmet accreditation standards*. This document stated that before an activity is in practice, an overview of potential risks should be created. During the activities, additional risks should be added to this. Risk management strategies and guidelines need to be clear for staff. A committee, including external members, must be in place to keep track of risk management. There needs to be documentation on their meetings. External reviews must be done during the three years of accreditation to ensure that no possible risks are overseen. A system for tracking and analysing incidents, near misses and illnesses is needed to improve the learning site. This information needs to be actively visited by multiple people to improve.

Before each activity, possible health issues (mental and physical) of staff and visitors need to be mapped since some health issues can induce dangerous situations during the activities. This information should be handled carefully since it is confidential. A crisis management plan must be in order if a significant incident leads to severe or fatal injury. The staff needs to know what to do regarding the visitors, family of the visitors, media, insurance companies etc. This plan needs to contain information to handle the situation in the short and long term. Staff must be able to deliver first aid when needed, and the first aid supplies should be available at the learning site and of good quality. Specifying the practices needed from any Wilderness First Responder certifications is necessary since different curricula have different certifications. The specification needs to prevent a shortage of knowledge in staff.

Regarding transportation, AEE does not provide specific guidelines on the age or experience of staff; however, they expect learning sites to have an assessment or training for transporters in place. This is especially important with specific transport vehicles, like trailers. An assessment is needed when personal vehicles from staff or visitors are used. Insurance and maintenance need to be checked. As stated in the paragraph above, the AEE has a policy to manage the quality of the equipment used during activities (Funnell et al., 2021).

Safety: A risk assessment needs to be done before an activity takes place and risk management strategies need to be made according to all three accreditation bodies. The LOtC needs a report with external views of the safety during activities. The AEE states that the risk assessment needs to be done by a team including external professionals. During the CEVAS training, much emphasis is on the safety of the learning site. This applies to situations with heavy vehicles and hygiene concerns regarding farm animals and equipment risks. In addition, when the staff is transporting visitors, the insurance and vehicles must also be checked according to the AEE requirements. The other requirements in the documents of the LOtC refer to child safety and the care of possible farm animals. The AEE extends safety requirements to mapping staff's mental and physical health to ensure that they can work without causing unsafe situations. In addition, the staff needs to know specific

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6. Final considerations

Systems for accrediting organisations were systematically mapped, and three accrediting organisations were identified, contrasted, and discussed. We compared three organisations that accredit outdoor learning locations according to the dimensions of the accreditation process, effective learning, information, learners' needs, improvements, policy and procedures, and safety. It was identified that the *Learning Outside the Classroom quality badge* offered the most comprehensive information. This accreditation body covers all categories, but the comparison is lacking since their website likely contains little information about the other bodies. These differences between the three described systems emphasise the complexity of the accreditation of EOC activities. However, it is possible to envision a starting discussion about an accreditation system based on the characteristics of the LOtC and extend this system depending on the information to the AEE since it is essential to invest in national bodies that give accreditation to EOC activities to simplify the existing processes.

According to UNESCO, the learning sites we described are examples of the lifelong learning process. The activities at the learning places include formal learning when the learning activities contribute to the curriculum and non-formal learning since the place is alternative and the learning activities are not as rigid as in formal education (UNESCO, 2012). Furthermore, we described that accreditation of EOC is fundamental to maintaining the quality of and students' safety within the learning places. However, we found very little information about the accreditation of these learning activities in Europe and no information about a European network or framework.

Educational outcomes placed in the *European Qualifications Framework* are still compared to certifications gained within formal education. Placing the accreditation described and discussed in this report in the same system seems unlikely because the learning outcomes at learning places are expected to be only a fraction of the curriculum in formal education. The European Qualifications Framework is used to give accreditation to people's knowledge and skills gained over a long period instead of knowledge and skills gained during outdoor trips or activities that lasted for a maximum of a few days. However, the *European Qualifications Framework* demonstrates that creating a European-based network for RVAC of educational activities is possible. Therefore, another possible pathway to implement some accreditation model would be the *European Quality Framework*, which could be utilised to establish a European certifying organisation for EOC. As we identified in our mapping of the previous sections of this report, although there is a huge gap of information and reports, the diversity of EOC activities in practice and in potential allow and require such a rich path.

OTTER project focuses on EOC and aims to propose recommendations and guidelines for the accreditation of EOC. EOC can be part of formal, non-formal and informal learning activities. In the present report, we presented some examples of accreditation of EOC as part of non-formal and informal education. As for the EOC as part of formal education, closely related to the curriculum, there are no guidelines for accreditation EOC during the primary, secondary and high schools in Europe. At the EU level, these guidelines are already put into practice for Higher Education but not for the other levels of education. In this perspective, proposing guidelines for accreditation EOC remains challenging for both the OTTER project and the European framework. One way to make this task easier would be to consider the EOC from a three-fold perspective (formal, non-formal and informal education) to get inspired by good examples presented in the previous deliverables and the present report. Additionally, the guidelines provided in WP5 for accreditation of EOC in compulsory schools can also be inspired by the existing guidelines for Higher education.

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Appendix 1

Papers included in the *Practices to Places* section analysis

R01	**Dettweiler, U., Ünlü, A., Lauterbach, G., Becker, C., & Gschrey, B. (2015). Investigating the motivational behavior of pupils during outdoor science teaching within self-determination theory. Frontiers in Psychology, 6, 125.**
Country	Germany
Where?	National Park Berchtesgaden
How out-of-school science activity was structured? What was done?	The students collected biological and climatological data in groups in the park over two days. The data were analysed in the school's science centre upon their return from the expedition. All planning of the activities was done before the trip. The preparation, collection and analyses were performed during the "research week", which is part of the school's didactic activities. There is no information about the role of Park's organisation in planning and conducting the activities.

R02	**Otte, C. R., Bølling, M., Elsborg, P., Nielsen, G., & Bentsen, P. (2019). Teaching maths outside the classroom: does it make a difference? Educational Research, 61(1), 38-52.**
Country	Denmark
Where?	Nature
How out-of-school science activity was structured? What was done?	There are no specifics on how the EOC practices were conducted. The research group provided 2-day workshops on EOC pedagogy for teachers in 20 schools that participated in the study. Teachers incorporated EOC practices weekly into their math lessons. The researchers did not observe the lessons or the teachers' planning, so it is impossible to know how and where the activities were structured.

R03	**Salmi, H., & Thuneberg, H. (2019). The role of self-determination in informal and formal science learning contexts. Learning Environments Research, 22(1), 43-63.**
Country	Finland
Where?	Mobile science exhibition

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How out-of-school science activity was structured? What was done?	An itinerant science exhibition was prepared for schools that did not have easy access to existing science centres in the country. The exhibit provided exposition, demonstrations and content about "Everyday Science" in school environments such as gymnasiums and corridors. The exhibit was set up to complement content from physics, chemistry and biology and was planned for two years. From the paper: *"The pupils visited the exhibition and participated in experimental learning sessions to acquire knowledge and skills that would support the science curriculum learning goals of their school year."* The main goal was to motivate-13 years old to learn in 2 learning contexts, school and science centre. The activity was a mobile science exhibition at schools throughout Finland that did not have easy access to science centres. The exhibition presented an interactive science experience accompanied by several carefully selected hands-on exhibits. It is not mentioned who planned the activities of the exhibition (the researchers/science centres/teachers) or how much time the activities took. It is also not mentioned if there was guidance and how this guidance was structured. From the paper: *"The main idea was to give pupils an opportunity to explore hands-on exhibits through their own motivation".*

R04	**Scott, G. W., & Boyd, M. (2016). Getting more from getting out: increasing achievement in literacy and science through ecological fieldwork. Education 3-13, 44(6), 661-670.**
Country	England
Where?	Nature (a school pond; a local woodland; the hedgerow along a local bridleway, and the local rocky shore)
How out-of-school science activity was structured? What was done?	Teachers gave a short instruction, and children (9-11 years) had to explore a natural habitat around the school and identify organisms they encountered (1 session). They had to make photographs and notes about the appearance and location of the organisms. The children were also encouraged to write down questions that their encounter with the organism made them think about (e.g., what does it eat? How long can it live?). They were then asked to use their photographs and observations to produce a field guide that would be useful to other children visiting the site. Before (2 weeks) and after (4 weeks) the task, they had to assess to test the ecological knowledge, so the impact of learning through ecological fieldwork could be observed.

R05	**Bølling, M., Otte, C. R., Elsborg, P., Nielsen, G., & Bentsen, P. (2018). The association between education outside the**

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	classroom and students' school motivation: Results from a one-school-year quasi-experiment. International Journal of Educational Research, 89, 22-35.
Country	Denmark
Where?	Several places: nature and specific locations (museums/forests/parks)
How out-of-school science activity was structured? What was done?	The goal was to investigate the influence of EOC on the outcomes of physical activity, well-being, social relations, learning, and school motivation over 9-13 years old. Teachers participated in a two-day seminar on the pedagogy of EOC to inspire their own subject-specific curricular teaching practice outside the classroom. EOC intervention happened for nine months, and teachers incorporated EOC practices weekly for 3h. Researchers did not observe the lessons or the teachers' planning, so how and where the activities were structured is unknown. Questionnaires measured the motivation of children after EOC practices.

R06	**Genc, M., Genc, T., & Rasgele, P. G. (2018). Effects of nature-based environmental education on the attitudes of 7th-grade students towards the environment and living organisms and affective tendency. International Research in Geographical and Environmental Education, 27(4), 326-340.**
Country	Turkey
Where?	Nature
How out-of-school science activity was structured? What was done?	The goal was to determine the effects of nature-based education on the attitudes of 12-13 years old students. EOC was offered for 11 days, in a total of 18 activities, in a natural setting. There are no specifics on how the EOC practices were conducted. Questionnaires measured the students' attitudes before and after the EOC period. From the paper: *"The activities carried out in the study have been shown to meet the conditions for nature-based education"*

R07	**Kendall, S., Murfield, J., Dillon, J., & Wilkin, A. (2008). Education Outside the Classroom: Research to Identify What Training Is Offered by Initial Teacher Training Institutions. Research Report RR802. National Foundation for Educational**

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Country	England
Where?	Several places (science and geography fieldwork, woodlands, parks, theatre, museums, farms, education centres, and heritage sites)
How out-of-school science activity was structured? What was done?	The purpose of the research was to identify an existing provision and the need for, and direction of, additional training requirements and opportunities regarding the role and place of training relating to education outside the classroom. The researchers focused on the training of teachers (of primary and secondary school) for conducting the EOC practices, but there are no specifics on how the EOC practices were conducted (e.g., a guide tour, doing experiments). The researchers did not observe the teachers during the EOC practices, only questionnaires were administered.

R08	**National Foundation for Educational Research in England and Wales, & Dillon, J. (2005). Engaging and learning with the outdoors: The final report of the outdoor classroom in a rural context action research project.**
Country	England
Where?	Places and nature (school grounds/gardens/farms, (city) farms and nature centres and country parks)
How out-of-school science activity was structured? What was done?	The aim was to extend an understanding of educational activities that use the outdoor classroom in the rural context. The researchers visited 6 outdoor learning sites in 3 months. There are no specifics on how the EOC practices were conducted. The experiences/benefits/etc. of visiting the activities are given, but the specific structure of the activities and what was done are not mentioned.

R09	**Adams, D. and Beauchamp, G. (2018) 'Portals between worlds: A study of the experiences of children aged 7-11 years from primary schools in Wales making music outdoors', Research Studies in Music Education, 40(1), pp. 50–66.**

Country	England
Where?	(Historical) places (palaeolithic cave, neolithic chambers and fields, beach).
How out-of-school science activity was structured? What was done?	In the period of 2 years, several classes of children (7-10 years old) went with their teacher(s) and a research team to several (historical) places to make music. The children were challenged to create music for a ceremonial performance, which they then performed at the setting. They were permitted to alter or enhance their composition in the moment of their performance if they felt the alterations suited the atmosphere of the ritual. The teachers and the staff were observers. Words were not permitted in the music, but vocal sounds were allowed. The goal was to observe the impact of a (historical) outside-the-classroom location on the performance of the children.

R10	**Affeldt, F. et al. (2015) 'A non-formal student laboratory as a place for innovation in education for sustainability for all students', Education Sciences, 5(3), pp. 238–254.**
Country	Germany
Where?	Places (chemistry laboratories)
How out-of-school science activity was structured? What was done?	Goal was to use topics directly connected to formal learning in school, but with the structure of non-formal education in chemistry laboratories. Groups of 7-8 students (separated age dependently, from 11-16 years old) attended 7 experiments (7 different chemistry topics) of 15-25 minutes. Instructions of experiments were given in comics, blogs, news, messages on Instagram, WhatsApp, and Facebook (were selected according to the age range and their social environments). It is unknown if there were researchers/teachers present during the experiments. The researchers evaluated the feedback of the students afterwards to optimize the learning environment: there was a cyclical process of design, testing, evaluation, and optimization.

R11	**Ariosto, A. et al. (2021) 'Math city map: Provide and share outdoor modelling tasks. an experience with children', AAPP Atti della Accademia Peloritana dei Pericolanti, Classe di Scienze Fisiche, Matematiche e Naturali. Accademia Peloritana dei Pericolanti, 99.**

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Country	Italy
Where?	Place (primary school: Francesco Ventorino) and program (math trail around the city)
How out-of-school science activity was structured? What was done?	The goal was to help students grasp mathematical concepts such as surface and area through discovery activities based on mathematical laboratory activities. Experimentation took 3 months (a total of 14 hours in 5 meetings) and involved a class of 17 pupils of 10-11 years old. There were 3 classroom meetings and 2 outdoor meetings; Math teachers and researchers were present to guide. At outdoor meetings, students had to do a math trail (scavenger hunt) to find different polygons in the city and calculate their perimeters and areas. At indoor meetings, the required information was explained and/or outdoor meetings were reviewed.

R12	**Çelik, M. and Tekbıyık, A. (2016) '[The influence of activities based on GEMS with the theme of earth crust on the fourth grade students' conceptual understanding and scientific process skills'](), Pegem Eğitim ve Öğretim Dergisi. Pegem Akademi Yayincilik Egitim Danismanlik Hizmetleri, 6(3), pp. 303–332.**
Country	Turkey
Where?	Nature (around public village school in the Eastern Black Sea region)
How out-of-school science activity was structured? What was done?	Researchers set up 6 activities, and 13 students of 9-10 years old participated. Unknown how much time was between these activities. Part of the activities consisted of field trips in nature around the school, where students had to observe structures of rocks and soil formation. Another part of the activities consisted of informative videos, mathematical modeling and sharing opinions about the topics (e.g., erosion and fossils) at school. Researchers and teacher were present, teacher gave guidance after instruction of researchers.

R13	**Cotič, N. et al. (2020) 'The effect of outdoor lessons in natural sciences on students' knowledge, through tablets and experiential learning', Journal of Baltic Science Education. Scientia Socialis Ltd, 19(5), pp. 747–763.**

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Country	Slovenia
Where?	Nature (Youth health and Summer resort of Red Cross Slovenia – Debeli rtič)
How out-of-school science activity was structured? What was done?	Researchers set up 2 groups (experimental and control) of 9-10 years old. 8 different primary schools participated, equal in terms of gender. Groups had to do seashore activities: recognize plants/animals in the seashore environment, link their external appearance to their environment/way of life/sex and observe their adaptations to the environment. The experimental group worked with tablets, didactic tools and live material, the control group did not. During the activity, teachers were present. Lessons at the seashore were given by teachers but were planned/instructed by the researchers. Activities were given in 4 months, one time per group (5h excl. pre-/post-tests).

R14	**Dettweiler, U. et al. (2017) 'A bayesian mixed-methods analysis of basic psychological needs satisfaction through outdoor learning and its influence on motivational behavior in science class', Frontiers in Psychology. Frontiers Media S.A., 8(DEC).**
Country	Germany
Where?	Alpine National Park Berchtesgarden
How out-of-school science activity was structured? What was done?	The program was during 'research weeks', and it was a curriculum-based residential course centered on a 2-day research expedition. Groups of 3-4 students had to develop their knowledge in several curriculum topics. Each group was accompanied by 1/2 teachers or researchers. During the first 2 days of the course the groups had to prepare for the expedition in the lab, getting to know their plant. Students then completed a 2-day expedition where they had a research protocol and collected biological and climatological data. There is no information about the role of Park's organization in planning and conducting the activities.

R15	**Dunlop, L., Clarke, L. and McKelvey-Martin, V. (2019) 'Free-choice learning in school science: a model for collaboration between formal and informal science educators', International Journal of Science Education, Part B:**

	Communication and Public Engagement. Routledge, 9(1), pp. 13–28.
Country	Ireland
Where?	Places (20 UK state schools)
How out-of-school science activity was structured? What was done?	The focus was 'free-choice learning', where the learning was not focused on predetermined, fixed learning outcomes but on questions created and selected by students and their responses to these questions. Teachers worked with the educator to agree on the themes for and intensity of the discussion sessions. The teacher gave a lesson, then students had free choice over the subject, focus and their interactions. Students (11-14 years old) created philosophical questions in response to the stimulus and voted for the question(s) for discussion. Each session was facilitated by the university educator and observed by the teacher.

R16	**Eren-Sisman, E. and Koseoglu, F. (2019) 'Designing a magic flask: a new activity for teaching nature of science in both formal and informal learning environments', Science Activities: Projects and Curriculum Ideas in STEM Classrooms, 56(3), pp. 108–118.**
Country	Turkey
Where?	Educational program (in the classroom OR at the science centre)
How out-of-school science activity was structured? What was done?	The goal was to discuss the nature of science (the magic flask activity) in an informal learning environment in the context of the history of science through an explicit-reflective approach. The teacher had a leading role in this activity, partly directed by the researchers, but also free to apply their own knowledge. Different classes went to the science centre for this activity, other classes did the activity in the classroom. The students were 14-18 years old. The activity took 3h incl. modeling and discussions. Steps: 1) teacher introduced topic with a video OR students could experience it live in the science centre, 2) discussed possible solutions and drew an informal sketch, 3) students constructed in groups the physical model or prototype, 4) students tested and redesigned the model, and 5) students presented and evaluated the model. The researchers administered questionnaires to teachers to evaluate and improve the activity.

R17	**Harris, R. and Bilton, H. (2019) 'Learning about the past: exploring the opportunities and challenges of using an**

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	outdoor learning approach', Cambridge Journal of Education. Routledge, 49(1), pp. 69–91.
Country	England
Where?	Educational program (at an outdoor learning centre in the south of England)
How out-of-school science activity was structured? What was done?	One primary school (children of 7-9 years old) participated during autumn in a two-day residential programme at an outdoor learning centre that specializes in history education. The researchers were on-site during the two days to observe the activities and how the children engaged with them. The activities were focused on the Vikings. For example, the children could do crafts, reenact battles, taste food, and wear the clothing of the time. Through these experiences, the children could learn from the (time of the) Vikings. it is unknown whether these activities were prepared by the centre or the researchers/teachers. The researchers gathered data from the class teacher, parents, and children by doing interviews during and 6 weeks after the programme.

R18	**Kanlı, U. and Yavaş, S. (2021) 'Examining the effect of workshops pedagogically modelling exhibits at science centres on the development of students' conceptual achievements', International Journal of Science Education, 43(1), pp. 79–104.**
Country	Turkey
Where?	Events (exhibitions at Bursa Science and Technology Center)
How out-of-school science activity was structured? What was done?	The researchers made 4 groups of 14-15 years old, 1) a traditional teaching (8h) group, 2) a field trip to the science centre (4h) after teaching the subject (4h) group, 3) a workshop (4h) after the field trip to the science centre (4h) group, and 4) a field trip to the science centre (4h) after the workshop (4h) group. Applications for each group lasted 4 weeks, pre-/post-tests included. The science centre organized exhibitions (such as Our Mission Mars, Sultans of Science). The activities were e.g., science shows and workshops such as modelling, coding woodwork and science experiments.

R19	**Kärkkäinen, S. et al. (2017) 'The effects of socio-scientific issue based inquiry learning on pupils' representations of landscape', Environmental Education Research, 23(8), pp. 1072–1087.**

Country	Finland
Where?	Nature (Koli National Park and its visitor centre)
How out-of-school science activity was structured? What was done?	Participants were primary school pupils (n=36, 9–12-year-olds). The task for pupils was to inquire what social and scientific factors shape the landscape. The activity was structured in the form of 20 tasks. The first 7 tasks took place at the school, where teachers had to give lessons on specified topics. The next 6 tasks took place at the park's visitor centre, where park employees had a guiding role. The next 5 tasks took place at a guided field trip at the park, guided by the employees. The last 2 tasks took place at school after the visit, where the focus was on drawing and picture analysis. The unit was originally planned by an educational expert from the University's teacher education department, in co-operation with Nature Park guides in Koli. It is unknown if the researchers were present at the activity and what their role was.

R20	**Meyerhöffer, N. and Dreesmann, D. C. (2021) 'Using English as the Language of Science: An International Peer Video Exchange on Ecology', National Association of Biology Teachers, 83(3), pp. 154–160.**
Country	Germany and U.S.
Where?	Nature (Fasanerie Wiesbaden and Sonoran Desert of Southern Arizona)
How out-of-school science activity was structured? What was done?	The researchers set up an English-German bilingual teaching unit centered on a video exchange between German students and U.S. peers. The curricular topic covered was ecology. First, the researchers had contact with teachers at schools in U.S. and Germany to prepare the activity. Then the peers had to make an introduction video for each other. Then both schools went on a field trip in their natural environment and collected data. Data was then shared using a presenting video, to each other. The field trips were planned beforehand by the researchers. The German students' content knowledge was assessed to examine whether English-language elements had a negative effect on content learning. The exchange of material was conducted over the course of 6-7 weeks.

R21	**Moorhouse, N., tom Dieck, M. C. and Jung, T. (2019) 'An experiential view to children learning in museums with Augmented Reality', Museum Management and Curatorship. Routledge, 34(4), pp. 402–418.**

Country	England
Where?	Place (museum)
How out-of-school science activity was structured? What was done?	One class of 19 children aged 7-8 years participated. The activity took 1 day at the museum. The aim of the activity was to explore the knowledge and skills gained from 'augmented reality experiences, in this case, mobile technology. The children were allocated to explore the museum and identify several points of interest through the AR application. Then, the children had to complete a quiz on the application while participant observation was conducted. Directly afterwards, the children were divided into groups of 6-7 and three focus groups were conducted on the museum premises. After the activity, the researchers asked the children several questions that focused on concrete experience, reflective observation, abstract conceptualization, and active experimentation.

R22	**Nikou, S. A. and Economides, A. A. (2015) 'The effects of Perceived Mobility and Satisfaction on the adoption of Mobile-based Assessment', in Proceedings of 2015 International Conference on Interactive Mobile Communication Technologies and Learning, IMCL 2015. Institute of Electrical and Electronics Engineers Inc., pp. 167–171.**
Country	Greece
Where?	Nature (botanical garden)
How out-of-school science activity was structured? What was done?	A Group of 47 secondary school 16-year-old students participated. The activity was a mobile-based assessment procedure in the context of a project-based course about environmental education. Students used their mobile devices (the camera and the QR app) to scan QR codes placed on the target plants in the botanical garden under investigation. By scanning the code, students were redirected to web addresses with relevant learning content and questions about the plants under observation. It is unknown if the researchers were present during the activity and what the specific collaboration was between the garden and the researchers. It seems that the activity happened once, but this is unsure.

R23	**Petersen, G. B. et al. (2020) 'The virtual field trip: Investigating how to optimize immersive virtual learning in climate change education', British Journal of Educational Technology. Blackwell Publishing Ltd, 51(6), pp. 2098–2114.**

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Country	Denmark
Where?	Place (technology lab for schools)
How out-of-school science activity was structured? What was done?	102 middle school students took a virtual trip to Greenland to learn about the effects of global warming on the ice sheet. The goal was to see the effect of learning via VFT on behavior. First, students were instructed by their biology or natural geography teachers. After this, the integrated group started the VFT, while the pretraining group listened to the narration in a separate room and started the non-narrated version of the VFT. After completing the VFT, students in each condition were required to work together in groups to discuss what they had learned. The total activity took ~4h and was conducted in the context of an inquiry-based learning workshop on climate change.

R24	**Riegel, U. and Kindermann, K. (2016) 'Why leave the classroom? How field trips to the church affect cognitive learning outcomes', Learning and Instruction. Elsevier Ltd, 41, pp. 106–114.**
Country	Germany
Where?	Place (local church)
How out-of-school science activity was structured? What was done?	The activity concerns a field trip to the local church. The goal was to compare cognitive learning outcomes inside and outside the classroom. Several classes of 8-9 years old participated. The outside-the-classroom activity consisted of several concepts. First, the children had to explore the church by small exercises activating different senses like feeling, hearing, smelling, etc. Then explore the different objects in the building and then paint the church building. The aspects were planned beforehand by the researchers. It is unknown who (researchers/teachers/parents) were present during the activity.

R25	**Salmi, H. S., Thuneberg, H. and Bogner, F. X. (2020) 'Is there deep learning on Mars? STEAM education in an inquiry-based out-of-school setting', Interactive Learning Environments. Routledge.**

Country	Finland
Where?	Event (Mobile interactive mathematics exhibition)
How out-of-school science activity was structured? What was done?	306 11-13 years-old participants. The Ontario Science Centre originally designed the Canada exhibition and later modified it for the Finnish Science Centre. It consisted of 30 interactive, concrete, and digital exhibition objects with topics relating to basic physics, astronomy, biology and psychology, Students were allowed to use, test, explore and learn in their own way during a 90-minute timeframe. The exhibition guide only spoke in an introductory and tutorial role. The classroom teacher was only responsible for practical arrangements. The researchers' idea was to test and challenge visitors' own capacities, knowledge, attitudes, and willingness to participate in a journey to Mars – and back.

R26	**Schneiderhan-Opel, J. and Bogner, F. X. (2021) 'The effect of environmental values on German primary school students' knowledge on water supply', Water (Switzerland). MDPI AG, 13(5).**
Country	Germany
Where?	Environmental education program at the Bavarian Forest National park
How out-of-school science activity was structured? What was done?	The activity was a learning module on water supply which was part of a week-long field trip to the park. A national park guide led the module, which took three hours. The participants (5 primary schools ~10 years old) were exposed to learner-centered and cooperative learning. They worked independently, guided by a workbook that contained all necessary information and contributory tasks. The guide did only intervene when students raised questions. There were 5 aspects in this module, where several activities were established. E.g., children had to create a schema of paper cards about the water cycle, participate in a guided tour to the plant-based wastewater treatment facility and do experiments on the filtration capacity of soil.

R27	**Stöckert, A. and Bogner, F. X. (2020) 'Cognitive learning about waste management: How relevance and interest influence long-term knowledge', Education Sciences, 10(4).**
Country	Germany
Where?	Place (on several primary schools)

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How out-of-school science activity was structured? What was done?	276 10-11 years old participated in a three-module implantation study. The module was about waste-management and was designed for three school lessons (135 min). Each lesson combined hands-on and peer-guided activities in class or out-of-class. Students collaborated in pairs or small groups, guided by a workbook, and instructed by the same teacher. They self-assessed their results by comparing them with the teacher's desk booklet. The researchers planned the module; however, they were not present during the lessons. Due to questionnaires, they acquired knowledge of the students/teachers.

R28	**Thuneberg, H. and Salmi, H. (2018) ['To know or not to know: uncertainty is the answer. Synthesis of six different science exhibition contexts'](), Journal of Science Communication. International School for Advance Studies, 17(2), pp. 1–28.**
Country	Finland, Sweden, Latvia and Estonia
Where?	Places (schools) and several exhibition events (4D-math exhibition, Natural Phenomena exhibition, Hands-on Science exhibition, Dinosaur and Evolution exhibition, Mars and Space exhibition and Augmented Reality exhibition)
How out-of-school science activity was structured? What was done?	The purpose of the research was to study knowing, learning, and especially the role of uncertainty in gaining knowledge in formal (school) and informal (science exhibition) science learning contexts. In total there were 2591 participants of 12-13 years old. The teachers did not prepare their pupils for the exhibition visit. There is no specific information mentioned about the structure of the activities involved during the exhibition visits. The researchers were more interested in the knowledge acquired after the visits, so the pupils had to make tests where topic-related statements were appointed.

R29	**Thuneberg, H., Salmi, H. and Fenyvesi, K. (2017) ['Hands-On Math and Art Exhibition Promoting Science Attitudes and Educational Plans'](), .**
Country	Finland
Where?	Event (Math and Art exhibition)
How out-of-school science activity was	256 participants of 12-13 years old. The exhibition consisted of eleven interactive 'hands-on' science exhibition objects, which the students were allowed to use, test, explore, and learn freely

structured? What was done?	during a 45-minute time period. Following that, they attended a workshop (also 45 minutes) in which they were allowed to build their own structures and creatures. It is not mentioned if there was guidance and if/how much teachers and/or researchers and/or employees were involved.

R30	**Triantafyllidou, I. et al. (2018) ‘FingerTrips on tangible augmented 3D maps for learning history’, in Auer, M. E. and Tsiatsos, T. (eds) Advances in Intelligent Systems and Computing. Cham: Springer International Publishing (Advances in Intelligent Systems and Computing), pp. 465–476.**
Country	Greece
Where?	Event Exhibition FingerTrips (an augmented interactive 3D model of a historical site)
How out-of-school science activity was structured? What was done?	The idea of the research was integrating ICT in history teaching can enhance historical thinking and understanding and may promote the exploration of the past with a critical approach rather than the passive accumulation of information. 26 11-12 years old participated. The activity was ‘explore a FingerTrip environment’, which was an augmented interactive 3D model of a historical site. After brief instructions were given to each group to help students become familiar with the concept of interacting with the 3D model, they played with the FingerTrips environment in groups of 2/3 students. The researchers offered guidance whenever the participants requested for. After each session, students were asked to complete an online questionnaire about their experience.

R31	**Halonen, Julia & Aksela, Maija 2018. Non-formal science education: The relevance of science camps. LUMAT: International Journal on Math, Science and Technology Education 6(2), 64–85.**
Country	Finland
Where?	Events (Science camps organized by the University of Helsinki LUMA Centre)

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How out-of-school science activity was structured? What was done?	The aim of the study was to look at the relevance of non-formal science education in science camps. This study involved 46 science camps, where ~900 primary school children participated. The camps lasted for 5 days, and the daily program contained several activities. All the camps contained different kinds of games and fun, which also played a part in learning about the theme of the day. During the activities, there was guidance, but it is not specified how this guidance was structured. From the paper: "Mathematics camps solved various codes and puzzles, programming camps made their own games etc.”

R32	**Sjöblom, Pia & Svens, Maria 2019. Learning in the Finnish outdoor classroom: Pupils’ views. Journal of Adventure Education & Outdoor Learning 19(4), 301–314.**
Country	Finland
Where?	Program (at a nature school)
How out-of-school science activity was structured? What was done?	The nature school is an environmental educational organization promoting and scaffolding the concept of sustainability, interest in nature and environmental sensitivity. The activity of this study was an educational program in which pupils would learn to know a few species in the area they visit and to understand the principle of a food chain and reflect upon their learning. The activities of the nature school were planned and delivered by a teacher at the school itself and took 1 day for 30 10–11-year-olds. It is not specified how the activity was structured, only that it was hands-on.

R33	**Nuora, Piia & Välisaari, Jouni 2018. Building natural science learning through youth science camps. LUMAT: International Journal on Math, Science and Technology Education 6(2), 84–102.**
Country	Finland
Where?	Events (science camp, organized by the University of Jyväskylä)
How out-of-school science activity was	The main idea of the science camp was to learn to do guided inquiry in nature. The permanent topics included nature, water,

structured? What was done?	and environment and were integrated with chemistry and biology. It is not specified in the paper how the activities of the camp were structured and what was done. It was organized by the university, but it is not mentioned what its specific role was, nor of the researchers, during the activities. It is not mentioned how many days the camp took.

R34	**Vuopala, E., Medrano, D. G., Aljabaly, M., Hietavirta, D., Malacara, L., & Pan, C. 2020. Implementing a maker culture in elementary school - students' perspectives. Technology, Pedagogy and Education, 29(5), 649-664.**
Country	Finland
Where?	Program (educational project at school and the FabLab)
How out-of-school science activity was structured? What was done?	The activity was a group project at school and the FabLab in the context of a 'maker culture'. The activity took 5 days, 5h a day. The task for the children was to design a house for the class mascot. Each group had to make a room. The project consisted of 3 phases: planning (at school), application (at the FabLab), and presentation (at school). FabLab is an open space for different kinds of fabrication projects and provides a variety of equipment. Each group was guided at the FabLab by a university student in the field of education and technology. The teacher had a guided role at school, directed by the researchers. It is not mentioned if the researchers were present during the activities.

R35	**Nicolas, L. (without year). Ma Petite Forêt. Online source https://mapetiteforet.fr/la-sylvopedagogie/**
Country	France
Where?	Forest education

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How out-of-school science activity was structured? What was done?	Based on experimental learning, the booklet presents the benefits of nature education for students and teachers: risk-taking, development of creativity and imagination. Activities were structured using different methods: learning by doing, learning by moving, learning by manipulating, collective games and forest bathing. Different learning activities were done, and it resulted that knowledge is better understood when it is learned in the nature, contents are applied in daily life easier, and attachment of the nature supports students to grow up safely. The forest was the privileged place to organise the outside the classroom activities.

R36	**Réseau École et Nature/Network School and Nature. (2013). Syndrome de manque de nature. Du besoin vital de nature à la prescription de sorties. Réseau École et Nature, Online source.**
Country	France
Where?	Learning activities in nature
How out-of-school science activity was structured? What was done?	Learning activities organised in the middle of the nature, in all its forms, help students to fight against screen activities, obesity, impulsivity, depression, aggressivity, sedentarism, attention troubles, sleep troubles, physical and mental illnesses and specially to diminish the "nature-deficit disorder" and "biophobia". Outdoor educational programmes and environmental education programs help students to develop emotions and auto-discipline. Learning activities were structured as collective games in nature.

R37	**Surfrider Foundation Europe (without year). Osparito Guide pédagogique de suivi des déchets sur les plages. Surfrider Foundation Europe, online source.**
Country	France
Where?	Waste removal on beaches and coastlines

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How out-of-school science activity was structured? What was done?	In France, there is a national network of waste monitoring on beaches and the paper share good practices for teachers on how to organise out-of-school science activities on beaches. The main pedagogy used focusses on both evidence-based intervention and police intervention. Students got familiarised with research approach in education by analysing the quantity and diversity of garbage collected, and by filling in a questionnaire in this regard. Learning activities were structured as participatory intervention and collective intervention. Students were split into several groups for collecting the garbage, analysing and weighing it, and finally for disseminating the results and promoting reflexion on beach garbage.

R38	**Frappart, S. & Frède, V. (2015). Conceptual change about outer space: how does informal training combined with formal teaching affect seventh graders' understanding of gravitation? European Journal of Psychology of Education 31, 515–535.**
Country	France
Where?	Space museum
How out-of-school science activity was structured? What was done?	Learning activities were focused on knowledge about environment and more specifically, on outer space. The out-of-school science activity was developed in a museum space. Students were split into two groups: one doing learning activities only in the classroom (14 students); and the second one combining the classroom activities with a visit to a space museum (14 students). The questionnaire was the main method used for assessing the learning activities, during the pre-test and the post-test. The results highlighted that the science event – visit to the space museum – supported students to acquire more scientific knowledge, compared to the students that learned about scientific concepts only during the classroom activities.

R39	**Donnelly, D., O'Reilly, J., & McGarr, O. (2013). Enhancing the student experiment experience: Visible scientific inquiry through a virtual chemistry laboratory. Research in science education, 43(4), 1571-1592.**
Country	Ireland

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Where?	Virtual Chemistry Lab (VCL)
How out-of-school science activity was structured? What was done?	The research questions were centred on teachers' use of inquiry-based approaches in secondary schools through a VCL, but there was an implicit interest on cases involving students who had a 'high-stakes' examination focus. The focus of the case studies in this research was on chemistry teachers teaching a guided inquiry lesson using a specifically designed titration problem on an interactive simulation (VCL). The rationale behind choosing a titration problem is due the predominance of titrations in the current Irish chemistry syllabus.

R40	**Collins, C., Corkery, I., McKeown, S., McSweeney, L., Flannery, K., Kennedy, D., & O'Riordan, R. (2020). An educational intervention maximizes children's learning during a zoo or aquarium visit. The Journal of Environmental Education, 51(5), 361-380.**
Country	Ireland
Where?	Fota Wildlife Park in Carrigtwohill & Dingle Aquarium

How out-of-school science activity was structured? What was done?	From the paper: *The treatment groups participated in a purposefully designed, hour-long, hands-on educational intervention, designed to enhance students' learning in the zoo. The EI took place in the children's classroom before their visit to the zoo or aquarium. It focused on knowledge about the study species, children's attitude toward zoo-housed animals and learning in the zoo. (…). The EI included a PowerPoint presentation and an activity session during which children made environmental enrichment devices for lemurs and penguins, described here as a "hands-on" activity because the children constructed the devices themselves. Following the initial visit from the researcher to the school, all groups then attended either Dingle Aquarium or Fota Wildlife Park. The visit consisted of a guided tour of the park or aquarium of between 60 to 90 minutes in length, which focused on the different animal species on exhibit and conservation in general. It was presented by highly trained zoo or aquarium staff (…) Following their visit to the zoo or aquariums, post-surveys were administered (…).* Layout of Intervention: Pre-powerpoint presentation describing the biology of penguins/lemurs threats to environment etc. Hands-on activity where students make devices for the animals. Students visit the site to see how the devices worked for the animals.

R41	**Abbott, K., & Flynn, S. (2022). Outdoor education, interaction and reflection: a study of Irish outdoor ECEC. Irish Educational Studies, 1-21.**
Country	Ireland
Where?	Early childhood education and care (ECEC) and Forests

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How out-of-school science activity was structured? What was done?	From the paper: *This study aimed to gain an understanding of how educators enacted their role to create quality interactions outdoors, and to gain an understanding of educators' perspectives on the differences in their interactions indoors versus outdoors. Six of these participants worked in the ECEC sector in both outdoor and indoor preschools and had been working in the sector for more than five years. The remaining participant was a primary school teacher and outdoor educator who facilitated forest school and outdoor education programs in primary schools and natural play spaces for young children and teenagers. The contribution of the outdoor environment was central in constructing quality interactions. The large space that it provided, allowed children to interact with educators on a one to one or small group basis. There was opportunity for children to engage in many areas of the outdoor space without impeding on another child's personal space, preventing conflict arising. Both literature and the findings identified the importance of the use of natural and open-ended materials in the outdoor space. The space also allowed children to engage in activities using their whole bodies, in turn promoting risk taking and involving children in their own risk management. The topic of reflective practice was identified as playing an important role in the construction of quality interactions. Educators described the opportunities currently available to them in their settings, through non-contact time, and how this reflection took place for them. However, further findings identified that some participants only had 30 min of the one-hour non-contact time allocated to reflect, due to cleaning duties.*

R42	**Neylon, Jack (2019): Investigating the use of adventure education in fostering social skill development in students with autistic spectrum disorder. University of Limerick. Thesis.**
Country	Ireland
Where?	Mainstream Irish secondary school
How out-of-school science activity was structured? What was done?	From the paper: *Adventure education was timetabled for four classes during the week (two double periods). The group was also timetabled for four PE classes in the week, which consisted of a strand other than adventure education. Structure: (1) Actively completing tasks related to a specific adventure concept. (2) Class discussion reflecting on the groups use of the desired adventure concept. (3) Generalisation of the adventure concept through active discussion. Students see where this concept could actually be used. (4) Active experiment of the desired adventure concept of the specific adventure concept after the adventure education class.The students moved through the experiential*

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	learning cycle during each adventure class. Many of the activities that were included in the adventure education classes were adapted from the handbook: A Handbook of Ideas: Teaching Adventure Education (Tannehill and Dillon, 2007).

R43	**Murphy, M. C. (2018). Exploring the "construction" strand in the Irish primary school visual arts curriculum through the forest school approach. Journal of Adventure Education and Outdoor Learning, 18(3), 257-274.**
Country	Ireland
Where?	A large, urban, disadvantaged, multi-denominational Primary School. Maybe in a forest (Forest School Approach was used).
How out-of-school science activity was structured? What was done?	*Educators wishing to become Forest School Leaders must complete a level three qualification, which includes obtaining an outdoor first aid certificate. Trainee Forest School Leaders conduct a six-week block of practice and must submit a portfolio of work that is approved by an accrediting body.*

R44	**Gilligan, C., & Downes, P. (2022). Reconfiguring relational space: a qualitative study of the benefits of caring for hens for the socio-emotional development of 5–9-year-old children in an urban junior school context of high socio-economic exclusion. Journal of Adventure Education and Outdoor Learning, 22(2), 148-164.**
Country	Ireland
Where?	School garden

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How out-of-school science activity was structured? What was done?	From the paper: *This action research study sought to evaluate socio-emotional benefits for children of keeping hens in school and its potential to provide teachers with an intervention for developing such socio-emotional competences in boys and girls, 5–9-years old, in a junior urban primary school of high socio-economic exclusion. Children's project participation occurred weekly. The project took a universal approach including all children in both class levels. Each second-class teacher had a class of 15 pupils, allowing for participation of three children daily. Three children from each class formed a group of six children daily who took on care duties for the two pet hens, Elsa and Anna. There were 10 groups in total, odd numbers assigned to one class (SC1) and even numbers assigned to the other (SC2). Duties spanned across the day with basic feeding, watering and egg washing taking place. The coop was cleaned by Thursday's group and eggs were sold by Friday's group. Groups rotated weekly over a five-week period. The children were supervised by the organising teacher after junior and senior infant home time as second class stayed in for one hour longer. The project involved an infant teacher due to time requirements and availability after Junior and Senior Infants went home. Daily duties took approximately 20 minutes with 40 minutes assigned to Thursday's and Friday's tasks. School Security and Caretakers took on duties during weekends and holidays in collaboration with the organising teacher. The senior infant group were also a class of 15. The Special Needs Assistant in the class accompanied three children out each morning to let the hens out and collect eggs laid overnight. They checked for eggs in the afternoon and spent some supervised recreational time in the garden with the hens while the rest of the class were playing in the classroom during playtime.*

R45	**Martin, R., McMullen, J., & Murtagh, E. M. (2022). Implementing movement integration across the whole school: findings from the Moving to Learn Ireland programme. Irish Educational Studies, 41(2), 347-366.**
Country	Ireland
Where?	Rural primary school in the west of Ireland

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How out-of-school science activity was structured? What was done?	*The emphasis of the programme is to teach academic content using movement as a teaching method (to whole school – 58 students). Details describing the resource have been published previously (McMullenet al. 2016; McMullen, Mac Phail and Dillon 2019.). The current intervention was seven weeks in duration and took place from April to June 2015. Activity examples are included in the paper.*

R46	**Kelly, L., O'Connor, S., Harrison, A. J., & Ní Chéilleachair, N. J. (2021). Effects of an 8-week school-based intervention programme on Irish school children's fundamental movement skills. Physical Education and Sport Pedagogy, 26(6), 593-612.**
Country	Ireland
Where?	During PE class
How out-of-school science activity was structured? What was done?	From the paper: *The principal investigator with over eight years' experience coaching children (mainly in athletics) and a certificate in Coaching Children from Coaching Ireland (focusing on physical literacy), delivered all intervention sessions in each school's indoor sports hall. The intervention replaced PE lessons and consisted of two 45-minute sessions per week over 8 weeks (i.e. a total of 16 sessions, 720 min). The class teacher arranged and supervised alternative activities for non-participating children and did not assist with the intervention in any way. Similar to the structure of a previous community-based intervention, three skills were targeted during each lesson (Bardid et al.2017). Each lesson started with a warm-up, which also included a quick discussion on the skills being targeted in the session (10 min), two or three separate games/activities (30 min) and a cool-down which also incorporated some questioning and discussion on the skills just practiced (5 min). Intervention sessions were delivered using the principles of the TARGET acronym (i.e. task, authority, recognition, grouping, evaluation and time) to facilitate a mastery-motivational climate. An overview of the theoretical underpinning of the lesson structure which was informed by Achievement Goal Theory (Nicholls1984) and Self-Determination Theory (Deci and Ryan2008) is included in the supplementary material.*

R47	**Dunn, J., & Sweeney, T. (2018). Writing and iPads in the early years: Perspectives from within the classroom. British Journal of Educational Technology, 49(5), 859-869.**
Country	Ireland

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Where?	Early years classroom
How out-of-school science activity was structured? What was done?	From the paper: *This prior study on "Mobile Devices in Early Learning" gathered teachers' and children's perceptions on the use of iPads in the early years classroom over a 2-year period. Preliminary planning visits were made to the six schools, where the purpose of the research was explained and the teachers were asked to plan a compositional writing lesson which would involve children using the iPad at any stage of the writing lesson. Therefore, the children could be using the iPad for planning their writing, to write their content or to present their content which they may have written in their books. All of the schools had already been using iPads and were familiar with using a range of apps and it was up to them which app they chose to use for the lessons. Each researcher returned during the autumn and winter of 2016–17 to observe the compositional writing lesson with pupils which involved the use of an app on the iPad. The apps used by the children in the lessons included Book Creator, My Story, Puppet Pals and Sonic Pics.*

R48	**Kopasz, A. R. (2019). Methodology tools in forest school and their impact on the development of ecological identity. Journal of Applied Technical and Educational Sciences, 9(3), 91-116.**
Country	Hungary
Where?	Programs of national parks, forest authorities and other forest schools
How out-of-school science activity was structured? What was done?	Three types of forestry schools (forestry, national park, private and public education) were examined, and three different programs were developed. Volcanic operations program: The programme developed for grades 3 to 4 is similar in some respects to the previous age group, in that it also explores the links between man and nature and raises awareness of the importance of nature conservation. Pupils will be introduced to the possibilities of using the environment in a sustainable way. A new element is precision education through laboratory and experimental exercises. In the programme for Years 5 and 6, pupils are gradually involved in the protection of nature, and they also learn to find their way around and move outdoors independently using various methods. For pupils in grades 7-8, the need to ensure harmony between man and nature is emphasized as a vital issue for the survival of life on earth. Of the 18 hours of time used in the programme for grades 1 to 2, 16 hours are field activities and 2 hours are classroom activities.

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R49	**Leskó, G. (2018). [Az erdei iskola környezeti attitűd formáló hatása]() (Doctoral dissertation, University of Sopron. Pál Kitaibel Doctoral School. Environmental Pedagogy Program). [The forest school shapes environmental attitudes effect]**
Country	Hungary
Where?	Programs of four forest schools
How out-of-school science activity was structured? What was done?	The researcher measured 213 children's knowledge before and after the activity in the forest school for 6 months. Participating children had to fill out a questionnaire, then at the end of their 5th day in the forest school. Half a year later, they filled out again the questionnaire at school. Students were following a 5-day program, namely The forest school program, containing multiple activities as: 1. The rule of walking in the forest: Children learn how they can safely move comfortably in the nature. Furthermore, how to behave in nature to the slightest damage or disturbance caused by living and non-living things in nature. Testing a walking up the mountain, down the valley, correctly worn equipment. 2. Mushrooms are decomposition: Purpose: Let the children get to know the role of fungi in nature. Notice the degradation processes. The activity involves fungi observation, stages of decomposition by fencing around certain areas and observing creatures and leaves, and the change of soil texture with deepening levels. 3. Ilona Valley tour: Destination: Ilona stream valley observation of natural animate and inanimate elements found along, as well as their relationships. 4. The Veresvár hill conquest: Purpose: to see the medieval forestry former phase, to observe on the extremely steep slope that develops difficulties to the foresters in mountainous areas. 5. Night tour: Target: The night forest acquaintance. Safety developing a sense of children. The night is active observing the sounds of animals, recognize them by listening to their movements, and understanding that similarly everything works like day, only our weak senses they don't allow us to behave the same way. 6. The craft of setting fire, experimenting with lighting a fire.

R50	**Horváth, K. (2016). [Az Őrség természeti, tájképi és kultúrtörténeti értékeinek vizsgálata a környezeti nevelés komplexitásának tükrében, különös tekintettel a középiskolás korosztály esetére]() (Doctoral dissertation, Pál Kitaibel Doctoral School of Environmental Sciences of the University of West Hungary). [The natural, landscape and cultural-historical values of the Őrség in the light of the complexity of environmental education, with particular reference to the case of secondary school pupils]**
Country	Hungary

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Where?	Őrségi National Park
How out-of-school science activity was structured? What was done?	During the study, the author examined a sample in which one of the classes that were about to graduate took part in field exercises during the three-year knowledge acquisition process, while the other class did not. The exploration of the environmental attitudes of the two high school classes in the three-year process was done to demonstrate the role of personal experience based on field investigations in the formation of attitudes. Before starting the field exercise, the students had to complete several tasks, to understand the importance of preliminary material as motivation, and for the successful completion of the field investigation, for seeing and understanding the relationships revealed during the evaluation of the investigation results. Furthermore, they had to carry out a historical-ecological analysis of the sample area. Students were collecting samples using the book *Simon T. Seregélyes T. Növénysmisert*. During the field investigation, the students completed tasks like the selection of sample area. The purpose of sampling in the forest is to get to know the plant species composition.

R51	**Szákovicsné Bérczy, D. J., & Lakotár, K. (2015). A terepi oktatás fontossága és alkalmazásának lehetőségei a fenntarthatóság pedagógiájában, különös tekintettel az érzékeny természeti területekre= The Importance of Open Air Teaching and the Possibilities of Adoptions in Sustainaibility Teaching, Especially in Sensitive Natural Areas. KARST DEVELOPMENT/KARSZTFEJLŐDÉS, 20, 347-358.**
Country	Hungary
Where?	Green areas/Beach, Fertőszéplak

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How out-of-school science activity was structured? What was done?	Children were showed a completely new natural environment with places, e.g.: in the Tapolcaitavasbarlang or at the stone sea on the border of Szentbékkála. They could see what the cave formations look like, e.g.: globules, shells, shells, or how the cooling karst water breaks to the surface at the Theodora spring. They were also able to experience the benefits and importance of cycling. *In August 2013 and 2014, we held a bicycle Ecocamp in the Tapolca and Káli basins. Using a questionnaire composed of open-ended questions, the tasks of the camp were evaluated from the point of view of field education and sustainability pedagogy.*

R52	**Rigóczki C. (2018). Constructivist Environmental Education in Urban Walking Lane. Journal of Applied Technical and Educational Sciences, 8(3), Article 3.**
Country	Hungary
Where?	Urban area, Farkaserdő (4th district of Budapest).
How out-of-school science activity was structured? What was done?	Promenades consist of a series of stations that can be visited on foot, the function of which stations is to provide information to the participants walking along walking paths - to use the common usage of gamification (gamification) - is a mission, the completion of which brings joy to the participant, and can even be combined with treasure hunting or the joy of collecting (stamps, geo-location tasks, etc.).

R53	**Gősi V. K. (2018). Erdei iskolai projekt hatékonyságának vizsgálata ép fejlődési ütemű és enyhén értelmi fogyatékos tanulók körében. Journal of Applied Technical and Educational Sciences, 8(3), Article 3. [The Efficiency Test of the Forest Pedagogy Project Among Students with Normal Pace of Development and with Mild Intellectual Disabilities]**
Country	Hungary
Where?	Ravazd Forest School

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How out-of-school science activity was structured? What was done?	5-day long forest-school programme. The paper is focused on the evaluation of environmental education programmes, exploring the results, the strengths and weaknesses of the programme, its impact on children, including questionnaires, attitudinal analysis, concept maps and analysis of children's artwork. The pupils made a lapbook about the forest, which proved to be very useful, and the "peer helper" children made the task a fantastic experience and very effective work for the pupils. They assisted the pupils in the implementation of cooperative techniques, in many cases acting as "chaperones" to support the group's work. There was no pre-planning.

R54	**Uitto, A., Juuti, K., Lavonen, J., & Meisalo, V. (2006). Students' interest in biology and their out-of-school experiences. Journal of Biological Education, 40(3), 124–129.**
Country	Finland
Where?	Survey regarding pupils' interests in science education and out-of-school activities
How out-of-school science activity was structured? What was done?	The questionnaire contained 108 statements of pupil's interests in science education and 61 statements about their out-of-school activities. For each statement, the pupils were asked to indicate their response by ticking the appropriate box: What do I want to learn about? How interested are you in learning about (...)? My out-of-school experiences. How often have you done this outside school? The interests were recorded with a four-point Likert scale ranging from 'not interested' to 'interested', and out-of-school activities with the same scale ranging from 'never' to 'often'.

R55	**Morag, O., & Tal, T. (2012). Assessing Learning in the Outdoors with the Field Trip in Natural Environments (FiNE) Framework. International Journal of Science Education, 34(5), 745–777.**
Country	Israel
Where?	Field trips to nature and archaeological parks
How out-of-school science activity was structured? What was done?	During a field trip, activities were implemented involving walking along marked trails. During these walks, the facilitator offered explanations and demonstrations regarding the site's geography, history and/or wildlife. Sometimes, the facilitator led activities and/or games. During the walk, a chaperone was asked to stay at the back of the group; often, the teacher joined the parent at the back.

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R56	**Hellqvist, M. (2019). Teaching Sustainability in Geoscience Field Education at Falun Mine World Heritage Site in Sweden. Geoheritage, 11(4), 1785–1798.**
Country	Sweden
Where?	Falun Mine area in Dalarna County
How out-of-school science activity was structured? What was done?	This (theoretical) paper demonstrates the pros of using former mining areas as teaching site for geoscience, as they are pure geoscience areas that also stand as examples of human impact, environmental issues, sustainability and cultural history. The issues that can be explored extend into a variety of other subjects as well, such as social science, human geography, economic history and anthropology.

R57	**de las Heras Pérez, M. Á., Vázquez Bernal, B., Jiménez Palacios, R., & Jiménez Pérez, R. (2021). Environmental citizenship education through the doñana, biodiversity and culture program. *Sustainability*, *13*(5), 2809.**
Country	Spain
Where?	Doñana National Park
How out-of-school science activity was structured? What was done?	*The Doñana, Biodiversity and Culture Program is immersed in the line of environmental education intervention within the Aldea Program's Espacios Naturales de Andalucia. It is targeted at pupils of their 6th year of Primary Education. It consists in carrying out a didactic itinerary through an emblematic site of the National Park. Specifically, it comprises two parts: Visit of the Park staff to the school, specifically to the 6th of Primary classes. Here, they present the Doñana Natural Area and the activity that will take place. Visit to the Doñana Natural Area with the pupils. For four hours, a tour is made of the area, during which, through the different activities, the content of natural (fauna, flora, ecosystems) and cultural (history, lifestyles, traditions) heritage and the objectives of the project are worked on, i.e., to create a bond of identity with the territory so as to achieve the education of environmental citizenship.*

R58	**Laura Garrachón Redondo. (2015). Las salidas escolares en Primaria. Universidad de Valladolid. Facultad de Educación de Palencia. Grado de Maestra en Primaria.**
Country	Spain

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Where?	Park/Green area/Garden (not clear)
How out-of-school science activity was structured? What was done?	Sixth graders went to a green area near the school. They participated in activities before, during, and after the field trip. The goal was to contemplate and learn about gardens and green areas of the city from a historical and environmental point of view. The activity took about 4 hours. Learning objectives included exercising cartography, getting to know animal and plant species, and learning how to learn, among others. The themes were worked in an interdisciplinary way: geography, science, and history. The activities had a playful character (such as games and treasure hunts) and a descriptive nature (students writing down observations and answering exercises in notebooks).

R59	**Roxana Cebrián Rodríguez. (2014). La Salida de Campo como Estrategia Pedagógica. Universidad de Zaragoza. Máster en profesorado de Educación Secundaria Obligatoria, Bachillerato, Formación Profesional y Enseñanzas de Idiomas, Artísticas y Deportivas.**
Country	Spain
Where?	River zone, park
How out-of-school science activity was structured? What was done?	Research on geology education. Before the field trip, the students watched a video, read a text, worked with a dichotomic key and had a debate about oil. The field trip had two parts, one to observe the theoretical and practical contents discussed about rocks, and the other to analyse the economic interest of rocks.

R60	**Felipe, Y. L., Hernández, M. M., & Gómez, N. A. (2018). La excursión a la naturaleza o práctica de campo: una necesidad en la preparación metodológica de los docentes para contribuir al desarrollo local. *Foro educacional*, (30), 137-152.**
Country	Spain
Where?	Didactic material/Theoretic paper

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How out-of-school science activity was structured? What was done?	They describe two examples of activities that have been carried out for geography teaching. 4h in a park: at each station in the park students conduct guided observations about soil type and vegetation. Students characterize the" learning stations" using math and geography knowledge, involving spatial orientation and topography. Other activities involve investigating the history of the place. There is no information about activities conducted before or after the field trip.

R61	**Alonso, R. S. et al. (2019) ['Collaborative learning via social computing', Frontiers of Information Technology and Electronic Engineering]. Zhejiang University, 20(2), pp. 265–282. doi: 10.1631/FITEE.1700840.**
Country	Spain
Where?	Higher Schools Museum of the University of Salamanca
How out-of-school science activity was structured? What was done?	The paper describes the CAFCLA (Context-Aware Framework for Collaborative Learning Applications) pedagogical model. It then describes an activity using this model and compares the results of this activity with a control group of students. The students performed a type of treasure hunt in the museum with the support of technology. The activity started in the museum, done individually by the students, and ended in the classroom, with group work.

R62	**Salmi, H., Thuneberg, H. and Vainikainen, M. P. (2017) '[Learning with dinosaurs: a study on motivation, cognitive reasoning, and making observations]', International Journal of Science Education, Part B: Communication and Public Engagement. Taylor & Francis, 7(3), pp. 203–218.**
Country	Finland
Where?	Dinosaur science centre exhibition

How out-of-school science activity was structured? What was done?	Students aged 12 to 13 from 17 Finnish schools visited the dinosaur exhibition. The students answered questionnaires before and after the visit, but this was not done to map the success of a pedagogical approach. The text does not describe EOC practices, only that the students visited the exhibition.

R63	**Hasanen, E., & Vähäsarja, K. (2019). Moved by Nature–School-childrens experiences of outdoor activities in nature. *Metsähallituksen luonnonsuojelujulkaisuja. Sarja A*, *229*.**
Country	Finland
Where?	Outdoors/Parks
How out-of-school science activity was structured? What was done?	The report describes the results of a project that accompanied students' interest in outdoor activities during the 4 seasons. It describes activities done in each season, but does not mention pre learning. Many activities focus on physical education.

R64	**Aulikki Laine, Meri Elonheimo, Anna Kettunen. (2018). Loikkaa ulkoluokkaan: Opas ulkona opettamiseen (Leap into the Outdoor Classroom : Guide to Teaching Outdoors).**
Country	Finland
Where?	Outdoors/parks
How out-of-school science activity was structured? What was done?	Guide for teachers on outdoor education. Provides suggestions for activities for all seasons, different ages and school structures. Besides the pedagogical dimension, it contains practical tips such as first aid, clothing, materials, etc.

R65	**Palviainen, T., Pesonen, R., & Selenius, S. (2021). Lumitutkimus: kahdeksasluokkalaisille suunniteltu eheyttävä tutkimusprojekti etäopetuksessa. *LUMAT-B: International Journal on Math, Science and Technology Education*, *6*(1), 2-2. (Snow research: multi-disciplinary research-project for 8th graders in distance teaching)**
Country	Finland
Where?	Outdoor

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How out-of-school science activity was structured? What was done?	Using inquiry-based education the students carried out a research project about snow. The research questions were proposed by the students and were related to various disciplines (chemistry, physics, biology and geography). From the paper: *(p.5) The aim of this wide-ranging project was to integrate an element familiar to the pupils in their everyday lives, snow, into their scientific research, while practicing their investigative skills and interdisciplinary approach to the phenomenon. The original plan was for a face-to-face project with two out of three teachers participating remotely, but as schools moved to distance learning, the plan was changed accordingly. This also involved changes to the way the project was implemented: for example, the project became an individual rather than a group project, as the distance learning platform used by the school did not allow groups to be formed.*

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Appendix 2

Items included in the *Places to practices* section analysis

Cyprus

#	Name (place, site or program)
CYP01	The Cyprus Museum
CYP02	Cyprus Museum of Natural History
CYP03	Museum Of Industrial Pharmacy
CYP04	Shacolas Tower Museum & Observatory
CYP05	MUSAN Museum of Underwater Sculpture Ayia Napa
CYP06	KITION Planetarium and Observatory
CYP07	Thalassa Agia Napa Municipal Museum
CYP08	Cavo Greco Environmental Center
CYP09	Episkopi Environmental Information Centre
CYP10	CYENS Centre of Excellence
CYP11	Cyprus Center for Environmental Research and Education
CYP12	Akrotiri Environmental Education Centre
CYP13	Troodos Botanical Garden
CYP14	Terra Cypria

Finland

#	Name (place, site or program)
FIN01	Heureka
FIN02	Science Centre Pilke, Metsähallitus
FIN03	Tietomaa Science Centre, Museum and Science Centre Luuppi
FIN04	Arktikum - Science Centre and Museum
FIN05	LUOMUS Finnish Museum of Natural History
FIN06	Helsinki University Museum
FIN07	The Museum of Technology

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FIN08	Finnish Nature League, Luonto-Liitto
FIN09	Finnish Forest Association
FIN10	Finnish Youth Centres
FIN11	LUMA Centre Finland
FIN12	Kaisaniemi Botanic Garden
FIN13	Metsähallitus
FIN14	Harakka Nature Centre
FIN15	Finnish Nature Centre Haltia
FIN16	Environmental school Polku
FIN17	Meriharju Nature House
FIN18	Nature School Uttern
FIN19	Mappa Material Bank
FIN20	Jyväskylä University Museum
FIN21	Timosenkoski Nature School
FIN22	Korento Nature School
FIN23	Kumpula Botanic Garden
FIN24	University of Turku Botanic Garden
FIN25	The Science Forum – Science Festival
FIN26	The SciFest – Science Festival
FIN27	Ursa Astronomical Association
FIN28	Vapriikki Museum Centre

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France

#	Name (place, site or program)
FRA01	Les Étincelles du Palais de la découverte
FRA02	Mundolingua
FRA03	Cité Sciences et de l'Industrie
FRA04	Musée des Arts et Métiers le CNAM
FRA05	Musée Safran
FRA06	Museum Of The Iron Mining Of Lorraine The Neufchef Museum
FRA07	Planétarium Ludivier
FRA08	Galerie de Paléontologie et d'Anatomie comparée
FRA09	Paris Bar des Sciences
FRA10	Mineralogy Museum MINES ParisTech
FRA11	Muséum NalHist Naturele
FRA12	Espace des Sciences Pierre-Gilles de Gennes
FRA13	Galerie de Géologie et De Minéralogie
FRA14	Grande Galerie de L'évolution
FRA15	Musée Air+Space
FRA16	Vulcania en Auverne
FRA17	Palace The Universe And Science De Cappelle-La-Grande
FRA18	La Coupole
FRA19	Le Jardin des plantes
FRA20	Jardin des Plantes
FRA21	Jardin des Plantes Ville de Rouen
FRA22	Ekolien
FRA23	SOLOGNA Nature & Culture
FRA24	Musée National de l'Éducation, Rouen
FRA25	Le Vaisseau de Strasbourg

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FRA26	Musée Jules Vernes, Amiens
FRA27	Ma Petite Forêt, Laura Nicolas
FRA28	Musée Saint Remi, Reims
FRA29	Fondation Charles de Gaulle, Lille
FRA30	Musée Flaubert et Histoire de la Médecine
FRA31	Musée maritime, fluvial et portuaire
FRA32	Centre de la Vieille Charité
FRA33	Musée d'Archéologie Méditerranéenne
FRA34	Musée d'Histoire naturelle de Marseille
FRA35	Musée des enfants, Préau des Accoules
FRA36	Grotte Cosquer
FRA37	Musée zoologique
FRA38	Jardin botanique
FRA39	Ecomusée d'Alsace
FRA40	Ecomusée du Pays d'Auray
FRA41	Ecomusée des Monts de Forez
FRA42	Citadelle de Besançon, Forteresse Vauban Unesco
FRA43	Musée de l'Homme
FRA44	Cité des Sciences et Industrie
FRA45	Musée de la Chasse et de la Nature

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Hungary

#	Name (place, site or program)
HUN01	Hungarian Natural History Museum
HUN02	Futura
HUN03	Vegyészeti Múzeum
HUN04	BTM Vármúzeum
HUN05	ILLÚZIÓK MÚZEUMA
HUN06	CSopa Science Center
HUN07	Agora
HUN08	Csillagvizsgáló és Tudományos Élményközpont
HUN09	Nemzeti Botanikus Kert
HUN10	ELTE Füvészkert
HUN11	Magyar Környezeti Nevelési Egyesület
HUN12	Játékos Tudomány
HUN13	Kollabor
HUN14	Robokaland
HUN15	Mobilis
HUN16	Zsolnay Negyed Labor and Planetarium
HUN17	Tudományfesztivál
HUN18	Botanicon
HUN19	Szamóca Kiskertész
HUN20	Agroverzum
HUN21	MedveMatek

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Ireland

#	Name (place, site or program)
IRL01	The Steam museum
IRL02	Cork City Gaol
IRL03	St. Anne's City Farm & Ecology Centre
IRL04	Science Fundation Ireland - Cell explorers
IRL05	Science Gallery
IRL06	Forest School Ireland
IRL07	The Hollies
IRL08	Anyone 4 Science
IRL09	Heritage in Schools
IRL10	Ulster Museum
IRL11	National Museum of Ireland
IRL12	Rediscovery Centre
IRL13	Cloughjordan Eco Village
IRL14	National Maritime Museum of Ireland
IRL15	Computer and Communication Museum of Ireland
IRL16	Explorium
IRL17	National Science Museum Maynooth University
IRL18	Cool planet experience
IRL19	Armagh Observatory and Planetarium
IRL20	National Botanic Gardens
IRL21	Green School Ireland
IRL22	Brigit‘s Garden
IRL23	Dun an Si

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Spain

#	Name (place, site or program)
ESP01	Valladolid museo de la ciencia
ESP02	La Ciutat de Les Arts Les Ciències
ESP03	Parque de Las Ciencias
ESP04	Museu de la Ciència CosmoCaixa
ESP05	Museo de la Ciencia y el Agua
ESP06	Museo de Ciencias Naturales de Alava (Arabako Natura Zientzien Museoa)
ESP07	Museu de ciències naturales de Barcelona
ESP08	Casa de la ciencia sevilla
ESP09	Museo Nacional de Ciencias Naturales
ESP10	Eureka! zientzia museoa
ESP11	Casa das ciencias coruñeses
ESP12	Oceanogràfic València
ESP13	Museo nacional de antropologia
ESP14	Museo Abejas del Valle
ESP15	Museo de la Evolunción Humana
ESP16	Jardí Botànic de Barcelona
ESP17	La Concepción Jardín Botánico-Historico de Málaga
ESP18	Real Jardin Botanic
ESP19	Jardí Botànic de la Universitat de València
ESP20	Jardín Botánico Atlántico de Gijón
ESP21	Jardín Botánico Canario "Viera y Clavijo"

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The Netherlands

#	Name (place, site or program)
NLD01	Zpannend Zernike
NLD02	InScience film festival
NLD03	NEMO Science Museum
NLD04	CORPUS Musem
NLD05	Museum voor Anatomie en Pathologie
NLD06	Discovery Museum
NLD07	BODYWORLDS
NLD08	Space Expo
NLD09	Koninklijk Eise Eisinga Planetarium
NLD10	Planetarium Artis
NLD11	Cosmos Sterrenwacht
NLD12	Achterhoeks Planetarium
NLD13	Sonneborgh Museum & Sterrenwacht
NLD14	Old observatory Leiden
NLD15	Observeum Burgum
NLD16	TU Delft Science Centre
NLD17	Science Gallery Rotterdam
NLD18	Utrecht Science Park
NLD19	Citizen Science Wageningen University & Research
NLD20	Naturalis
NLD21	Botanische Tuinen Universiteit Utrecht
NLD22	Hortus Botanicus Amsterdam
NLD23	Hortus Botanicus Haren
NLD24	De veldhorst
NLD25	Melkveebedrijf Smelt-Luttikhedde
NLD26	Kom bij de boer
NLD27	Natuurcentrum Arnhem
NLD28	Stadsboerderij Beeklust

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NLD29	Kinderboerderij Emmelerbos
NLD30	Het Klokhuis
NLD31	Willem Wever
NLD32	Checkpoint
NLD33	NOS op 3
NLD34	Quest Junior
NLD35	National geographic

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Appendix 3

Form for analysis of places, programs and initiatives for EOC.

Name	
Website link	
Country	
Target audience	E.g., Age level, educational background
Location	Online or on-site If on-site, include the address/ Google Maps Link
Description	History of the place, type of activities offered, what are the particularities of the place, etc.
Information about partnership with schools	E.g., they accept bookings, have guided tours, have support materials for visits, etc.
Information about visitors	Visitors per year/month; profile (e.g., students, adults, teenagers, all ages, etc.)
Who funds the space/resource?	Name. Is it a public/private/NGO/ etc.?
Information about inclusion and accessibility	Does the space have inclusiveness and accessibility concerns? For example, is more than one language available, is there a structure for children with disabilities, etc.? How? 1. Offers multiple languages: languages available are in the national language and other languages such as English. 2. Offers structure for hearing/sight impaired children: offers a program for these children or allows bringing a companion. 3. Accessibility: the space is accessible with wheelchair.
Information about child safety	Does the space have safety concerns that may affect children (physical, psychological, and emotional)? How?
Information about the connection with the STEAM curriculum	Identify and list specific aspects of the activities that could connect to a STEAM curriculum
Information about the staff	Number of staff available. How many children per staff? Is there any information available about the type of training required for the staff? For example, are they trained in EOC activities or do they have only a "common" educational training? Are there staff trained to design, implement and/or evaluate/assess EOC activities? By which entity? Is this training official? Provided by entities linked to the Ministry of Education, etc.? What professionals work there (e.g., educational professionals, psychologists, health professionals, etc.)?
Other important considerations that can help us build our review	Any additional information that could help us to understand the importance of this place and map gaps and opportunities for introducing EOC accreditation, e.g., reports, videos showcasing some practices, etc.

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Appendix 4

Some of the results of our inventory with emphasis on the three examples discussed in this report.

Name	Observations
Accreditation of Prior Experiential Learning - APEL	Used by individuals
National Vocational Qualification - NVQ	Used by individuals
Scottish Vocational Qualifications - SVQ	Used by individuals
Investors in People Accreditations	Used by workplaces
Learning Outside the Classroom Quality Badge - LOtC	Provides accreditation to outdoor education
Countryside Classroom	Platform to spread information about EOC
Institute for Outdoor Learning	Accreditation of resources or courses for teachers/ universities
National Outdoor Learning Award scheme - NOLA	Not related to accreditation
Environmental Educator Certification Program (EECP)	Certification of teachers
California Regional Environmental Education Community Network - CREEC	A network from CDE to connect providers
Countryside Educational Visits Accreditation Scheme - CEVAS	Accreditation via course
Association for Experiential Education AEE	Accreditation of experiential learning
Natuur-Pedagoog	Only trainings, without accreditation

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