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Virtual Fossils for Widening Geoeducation Approaches: A Case Study Based on the Cretaceous Sites of Figueira da Foz (Portugal) and Tamajón (Spain)

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Abstract: Accessible palaeontological sites conform highly adequate out-of-school environments for meaningful learning experiences regarding formal and non-formal teaching of geosciences. With a perspective of international cooperation, two correlative Cenomanian–Turonian (Upper Cretaceous) outcrops from the Iberian Peninsula have been chosen as the focus of this project—the sections of Figueira da Foz (Portugal) and Tamajón (Spain)—along with the Palaeontological and Archaeological Interpretation Centre of Tamajón (CIPAT). Virtualization of fossil samples and sites has been undertaken by means of phase-shift scanning, photogrammetry, and small object scanning by structured light and laser triangulation, resulting in three-dimensional virtual models of the main fossil tracks and invertebrate fossil samples. These virtual fossils have allowed the development of transdisciplinary didactic activities for different educational levels and the general public, which have been presented as file cards where the age of participants, objectives, multiple intelligences, European Union key competences, needed resources, development, and further observations are specified. This work aims to contribute to improving the design and development of didactic sequences for out-of-school education at these sites, organizing effective transdisciplinary teaching tools, and developing awareness, values, and responsibility towards geoheritage.

Keywords: didactics; geoeducation; geotourism; geoconservation; natural heritage; virtual palaeontology

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1. Introduction

Palaeontology is a scientific discipline which studies the origin and evolution of life on the dynamic Earth, diving into the depths of time's arrow [1] through a Huttonian perspective of the sedimentary and fossil record. As it allies the extraordinary diversity and singularity of fossils with a rich conceptual and historical framework that allows palaeontologists to rediscover the worlds before Adam [2], it has been successfully explored by teachers as an attractive didactic resource for both formal (institutionalized, academic) and non-formal (outside the formal educational curriculum) educational contexts for geosciences, e.g., [3]. Content related to Earth sciences comes across as a valuable tool for the teaching–learning process to easily transmit the importance of science and its method, the role of researchers in society, how our planet evolved during millions of years, raise awareness about the relevance of protecting natural heritage, and as a whole, to address geoeducation. This term refers to an environmental learning, which also promotes geoethics, geoheritage, and geoconservation [4], to encourage people to understand and learn more about geosciences in general, aiming at organizing effective teaching tools [5] and applying modern means, such as three-dimensional (3D) modelling and its application to information and communications technologies (ICT).

Field trips implemented as part of out-of-school learning sequences allow for the development of important concepts and skills related to geosciences in general and Earth's history in particular, e.g., [6,7]. Therefore, accessible palaeontological sites conform a highly adequate out-of-school environment for meaningful learning experiences [8]. Specifically, Cretaceous geological formations and their commonest lithologies and facies can be easily found and accessed around the world, allowing for the replication of scientific education and outreach strategies in many regions [9], such as the "Cretaceous Viewpoint" in the Orígens Global Geopark (Spain, Mirador Cretaci: [10]) or the Cretaceous fossil sites in South Korea, which comprise a world-class geotourism resource [11].

Aiming to explore the potential of out-of-school learning through a perspective of international cooperation, two correlative palaeontological sites from the Iberian Peninsula have been chosen as the focus of the development of this project: the Cenomanian–Turonian (Upper Cretaceous) sections of Figueira da Foz (Portugal) and Tamajón (Spain) (Figure 1), where the virtualization of fossil samples and sites has been undertaken to develop a series of transdisciplinary didactic activities for different educational levels and the general public.

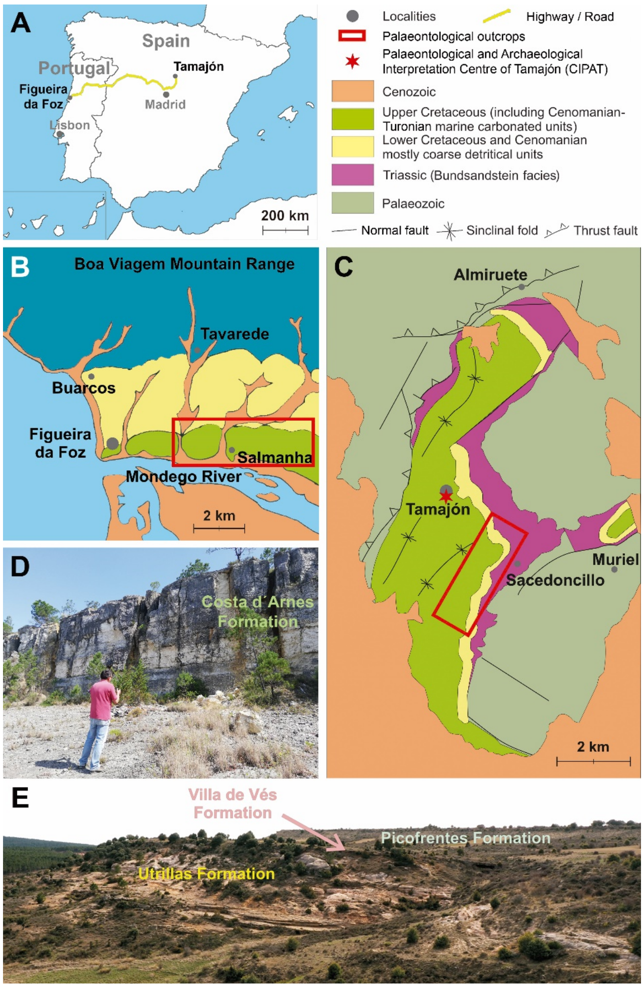

Figure 1. Geographical and geological context of the palaeontological sites of Figueira da Foz (Portugal) and Tamajón (Spain). (**A**) Map of the Iberian Peninsula locating the palaeontological sites of Figueira da Foz (Portugal) and Tamajón (Spain). (**B**) Geological sketch map of Figueira da Foz (Portugal). (**C**) Geological sketch map of Tamajón (Spain). (**D**) Photograph of the palaeontological site of Figueira da Foz showing the Costa d'Arnes Formation. (**E**) Photograph of the outcrops of Tamajón showing the Utrillas, Villa de Vés, and Picofrentes formations. Modified from [9].

2. Geological and Palaeontological Context

The fossil-rich palaeontological sites are exceptional examples of the diversity of marine fossil assemblages that were widespread in the warm and shallow carbonate platform environments of the Tethyan Realm during the Cretaceous Period, when sea-levels and global average temperatures were usually much higher than nowadays and where extraordinary flora and fauna evolved during millions of years (ca. 145–66 M.a.), e.g., [12,13].

The Cenomanian–Turonian section of Figueira da Foz (Portugal) is located near its namesake coastal town of west central Portugal, north of the Mondego River, near the estuary (Figure 1B) and very close to the entrances of the A14 and A17 highways. Local accessibility is excellent, including direct access to Coimbra, Aveiro, and the A25 highway to Spain. This site has been studied since 1849, and repositories of its fossil assemblages are housed at the Geological Museum (Museu Geológico, MG-LNEG, Lisbon) and the University of Coimbra (Universidade de Coimbra, UC, Coimbra), among other Portuguese institutions, demonstrating its scientific and educational value [14,15]. The main available exposures are found in two old quarries (Salmanha I and Salmanha II), where a set of mid-Cenomanian to lower-Turonian (Upper Cretaceous) marine beds of the West Portuguese Carbonate Platform are recorded by the Costa d'Arnes Formation. The 65 m thick of the stratigraphic succession holds several fossiliferous units with diverse ammonite content [16,17], such as the remarkable *Neolobites vibrayeanus* and *Vascoceras gamai* cephalopod assemblages, along with other abundant benthic invertebrates with Tethyan affinities, including many species of bivalves, gastropods, and echinoids (e.g., *Neithea hispanica*, *Tylostoma ovatum*, *Mecaster scutiger*) (Figure 1B,D). In addition, various sections of these sites are quite accessible and adequate for the development of outreach activities.

The Upper Cretaceous section of Tamajón (Spain) is located in the province of Guadalajara, approximately 1 h away from the northeast of Madrid, and combines high scientific, educational, and outreach values [9,18,19]. The sedimentary record of its Cenomanian interval reaches 35 m thick. It is included into the Utrillas Formation [20], where a coastal vertebrate tracksite has been described [21], and the Villa de Vés [22] and Picofrentes [23] formations, which yield a high diversity and abundance of marine invertebrates along with plant remains, bioturbations, and vertebrate fossil samples [18]. The latter has been biostratigraphically studied since the past century, having described a high diversity of invertebrate and vertebrate marine species, such as bivalves, gastropods, cephalopods, and echinoids (e.g., *Granocardium* (*Granocardium*) *productum*, *Tylostoma torrubiae*, *Vascoceras harttii*, *Hemiaster* spp.). Furthermore, the Tamajón vertebrate tracksite yields a high density of ichnotaxa, among which, to date, several tracks and trackways of crocodyliforms ("Galloping crocs": [24]), theropod dinosaur footprints, and fish fin traces have been described (Figure 1C,E). Furthermore, many representatives of these faunas are also housed in Portuguese and Spanish institutions, including the universities of Coímbra, Alcalá and Complutense de Madrid, and they are also partially available in public exhibitions, such as at the Palaeontological and Archaeological Interpretation Centre of Tamajón in Guadalajara, Spain (CIPAT for its acronym in Spanish: *Centro de Interpretación Paleontológica y Arqueológica de Tamajón*: [25]).

To date, the data and samples recollected from these sites have been studied with traditional palaeontological methods and tools. However, among other support resources for its research and didactics, virtual palaeontology (the study of fossils throughout 3D visualizations or virtual fossils: [26]) has become a popular non-destructive and non-invasive technique, as these new methodologies, along with traditional ones, offer a variety of advantages for the scientific and educational aspects of palaeontology [27], as well as for geotourism purposes.

Furthermore, the scientific and educational value of these palaeontological sites, along with the possibilities that virtual fossils can offer dissemination, outreach, and didactics, allow for addressing the crucial issue of educating society in preserving natural heritage through positive geoconservation actions. An effective strategy for this objective is to prompt geotourism in the localities and proximities of the outcrops. Geotourism is a relatively new form of alternative tourism, with significant European and global development potential [4], defined also by the Arouca Declaration [28]. Finding various definitions of the term, geotourism is viewed [29] as geological tourism that has a focus on geoheritage and with the main goal of attending geoconservation by education, being an essential and flexible tool to raise awareness about scientific findings and their role in society. Moreover, these initiatives also include geoethics, which widens the cultural horizon of geosciences knowledge and contributes to orienting scientists and society in the choices for responsible behaviour towards the future of humankind on planet Earth [30–32].

In the scientific literature, the terms geoheritage, geoethics, geoeducation, geoconservation, and geotourism are closely related to the development of geoparks and other geological points legally defined. However, the authors would like to state in this work the possibility of developing the mentioned terms in scientifically interesting geological and palaeontological areas, which may still not have been legally labelled as protected localities and yet could yield highly important scientific and didactic values where field trips, didactic activities, and even visitor centres could be developed. These are the cases of the natural environments of the palaeontological sites of Figueira da Foz and Tamajón, and the Palaeontological and Archaeological Interpretation Centre of Tamajón [25], which is a key component for the development of local geotourism based in the understanding of their identity or character and their natural attributes. Therefore, it should aim to provide education, especially for the benefit of young people and students, to encourage a wide range of the public to understand and learn about geology and the environment, in general, by using modern means.

3. Materials and Methods

Field work has been carried out in both Upper Cretaceous sites, Figueira da Foz (Portugal) and Tamajón (Spain), paying special attention to the exploration of didactic possibilities for on-site and virtual activities, along with recollection of fossil samples in each stratigraphic level, complemented by facies, biostratigraphic, and palaeoecological data for scientific and educational purposes. Furthermore, as the vertebrate tracksite of Tamajón must be virtually recorded in situ, a different approach was undertaken. To carry out an onsite preparation and the digitalization of the track surface by using laser scanning and photogrammetry techniques, an intensive field campaign was carried out during the summer of 2018. Firstly, the coverage of the surface was removed to prepare and clean the track surface (Figure 2A) for its posterior in situ study (Figure 2B). Then, researchers proceeded to the digitalization of the surface by means of phase-shift laser scanning (Figure 2C) and the systematic taking of photographs, essential to applying photogrammetry techniques. Lastly, the tracksite was covered again with geotextiles and local sediments as a way to take away the risk of subaerial deterioration and pillaging possibilities.

At the laboratory, the point cloud (combination of vertexes in a three-dimensional coordinate system) and over 600 photographs of the ichnite surface were obtained, respectively, by using laser scanning and photogrammetry techniques, and they were processed using different software. Moreover, small fossil scanning was carried out (Figure 2D) and followed by posterior treatment of the virtual results of the marine invertebrate specimens from both outcrops.

The sampled fossils were subsequently housed at the Department of Earth Sciences of the University of Coimbra (Portugal) and the Museum of Palaeontology of Castilla-La Mancha (Spain) and ceded temporarily to the Town Council of Tamajón to exhibit them at the CIPAT (Palaeontological and Archaeological Interpretation Centre of Tamajón [25]) (Figure 3).

Figure 2. Onsite and virtual palaeontology methodologies. (**A**) Cleaning of the track surface by means of traditional tools to enable correct taking of photographs and scanning of the tracksite. (**B**) Systematic on-site study of the main tracks, applying traditional methods such as drawings. (**C**) Phase-shift scanning of the track surface with the "Laser Scanner Focus 3D". (**D**) Laser triangulation scanning by using a small object scanner "NextEngine 3D Laser Scan" for the virtualization of invertebrate fossil samples.

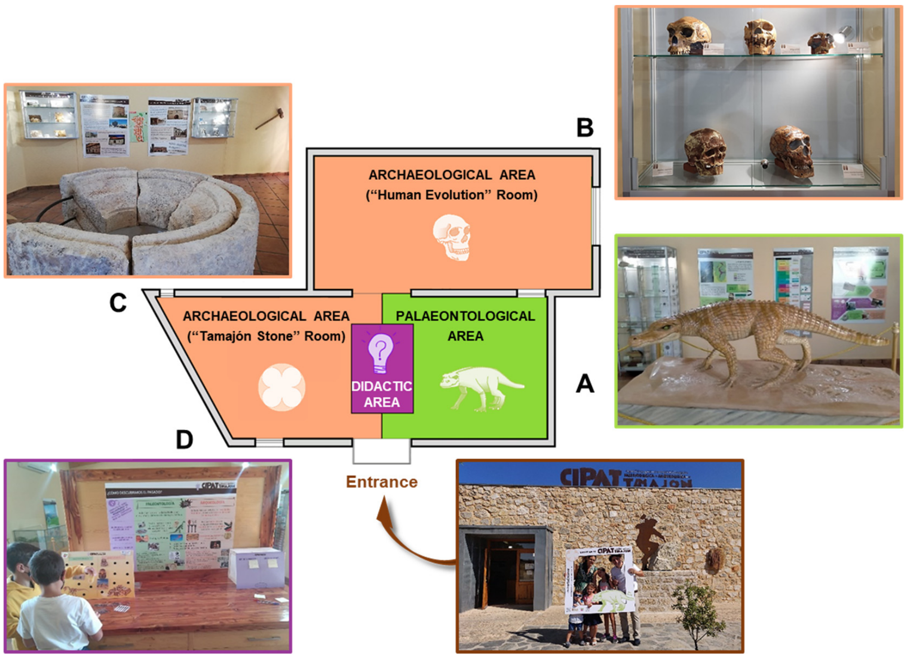

Figure 3. The Palaeontological and Archaeological Interpretation Centre of Tamajón (CIPAT). The map of the CIPAT in the middle, the Palaeontological Area (green, (**A**)), the Archaeological Area (orange, with the rooms of "Human Evolution" (**B**) and "Tamajón Stone" (**C**), and the Didactic Area (purple, (**D**)), and photographs of the front of the centre (entrance) and of each of the mentioned areas, following the anticlockwise itinerary.

Once the virtual palaeontology results were obtained, these made possible the design of several didactic activities, which are being carried out at the Didactic Area of the CIPAT [15] (Figure 3D), supporting the explanations of the infographic panels, real samples, and reconstructions held at the Palaeontological Area (Figure 3A).

3.1. Phase-Shift Laser Scanning

The device used is the "Laser Scanner Focus 3D" (Figure 2C), which uses LiDAR technology (Light Detection and Ranging), one of the leading choices for digital recording of tracksites [33,34]. Five measurements of 360° were completed with this technology, posteriorly obtaining a georeferenced point cloud.

Once on-site data were taken, the authors proceeded to process the information by using several software applications. The first set of data was extracted from "Trimble" (Geosptial software). To obtain the three-dimensional reconstruction, files were analysed and addressed with the "Autodesk ReCap" program.

3.2. Photogrammetry

The whole tracksite was photographed by ground-based techniques, using an "Olympus EM5 Mark 2" camera, with a resolution of 4608 × 3456 pixels. Considering the high density of different vertebrate ichnites, the tracksite surface was divided in a 1 × 1 m square metre grid. To process the photographs in the laboratory, the program "Autodesk ReCap Photo" was used, aiming to obtain 3D models of the main vertebrate crocodyliform tracks (CTA-1, CTA-2), the ichnite of a small theropod (DT-1), and the swimming track of a fish, assigned to *Undichna unisulca* (FST-1) [21].

3.3. Small Object Scanning

A small object scanner "CR-Scan01" from the Earth and Space Research Centre of the University of Coimbra (CITEUC, Portugal) and a "NextEngine 3D Laser Scan" from the Area of Palaeontology of the Faculty of Geological Sciences of the University Complutense of Madrid were used. The first scanner uses transmitted light, while the second one works with laser triangulation (MultiStripe Laser Triangulation; MLT). These devices are equipped with their corresponding software "CR Studio" and "Scan Studio", respectively, which were used to obtain in the laboratory a digital 3D model of the chosen samples, in this case marine invertebrate specimens from the sites of Figueira da Foz (Portugal) and Tamajón (Spain) (Figure 2D).

3.4. Geoscience Education

Didactics, understood as the way of teaching meaningfully to others, is essential for formal and non-formal educational contexts of geological sciences, as well as for outreach purposes, regarding this discipline to elaborate an adequate teaching methodology. Authors have considered the Earth Systems approach [9], with special emphasis on the development of thinking skills, critical analysis, and considering the objective of reaching environmental insight (*sensu* [35]).

The multiple intelligence theory [36] has been chosen as one of the main methodologies in which to base the didactic activities, e.g., [37]. Even though, since its first approach in the late past century, the multiple intelligences theory has been updated, only the first eight pillars have been considered for this work: the visual–spatial, linguistic–verbal, logical–mathematical, musical, bodily–kinaesthetic, interpersonal, intrapersonal, and naturalistic intelligences. Moreover, other approaches have also been considered, such as situated cognition [38,39] based on experiential learning [40], where learning experiences should involve similar types of activities as those which experts confront on a daily basis (e.g., taxonomical classification of invertebrate fossils), or the framework for museum practice (FMP: [41]), where visits to interpretation centres or to natural settings aim to develop the intrinsic motivation of pupils [42]. All together, they will enable reaching meaningful learning (*sensu* [43]), developing essential abilities and concepts such as high-order thinking skills (e.g., applying Bloom's taxonomy: [44]), critical thinking, or the affective domain towards others and the natural world.

This sequence considers as a main objective the role of education for citizenship and scientific literacy for society. Furthermore, taking into account that content regarding palaeontology is not usually considered or only briefly mentioned in the Portuguese and Spanish primary and secondary education curricula [7,37], the designed activities include the development of the European Union key competences [45] along with an insight to some of The Global Goals of the Agenda 2030 for Sustainable Development [46], such as goals number 4. Quality Education, 5. Gender Equality, 8. Decent work and economic growth, and 15. Life on Land.

The proposed activities have been mainly designed for their on-site implementation at the Figueira da Foz and Tamajón outcrops, as well as for the CIPAT (Palaeontological and Archaeological Interpretation Centre of Tamajón, Guadalajara, Spain: Figure 3). Here, the Didactic Area was projected between the Palaeontological and Archaeological sections to work as a nexus between them and as a complement to the permanent expositions where infographics, real fossil samples, and reconstructions are shown [15,25,47]. In this case, by giving supporting material and developing didactic activities for young and adult visitors, helping to understand different palaeontological aspects of the Cenomanian–Turonian of Tamajón (fossilization process, basic taxonomical classification, biostratigraphy, palaeoecology, palaeogeography, etc.), as well as more general content regarding geosciences, geoheritage, and geoethics, is facilitated.

These activities have been carried out in a non-formal education museum context, which implies that during their application participants can go back to the permanent exposition and look up information. Furthermore, these activities have been designed to be completed autonomously and in one single session of variable duration. Each activity covers a series of contents and objectives, not needing to follow a concrete sequence, constructing in this way different key ideas about science, palaeontology, and also specific aspects, such as regarding the Cretaceous life or the fossiliferous sites of Figueira da Foz and Tamajón. Nevertheless, ideally, a teaching agent (teachers, museum guides, counsellors, etc.) guides participants throughout the activities, facilitating tools which allow them to construct scientific knowledge, reaching meaningful learning experiences. Therefore, scaffolding techniques [48] are highly relevant for the correct implementation of the activities.

Feedback recollection has also been considered, as this information is essential to check the effectiveness of the proposed activities at the Didactic Area, compiling information regarding interests and the level of impact in relation to the set objectives and previous knowledge [49]. For the recollection of data, a variety of qualitative methods has been developed, mainly by means of didactic workshops and surveys. As part of an activity at the CIPAT, a feedback panel can be found at the Didactic Area, where participants can write something they have learnt during the visit and what they have enjoyed the most. This qualitative feedback has already been put into practice by the authors on several occasions throughout different outreach events [15,37], allowing the adaptation to educational interests and needs, especially for primary education levels; however, the results will not be discussed in this work.

4. Results

By means of phase-shift laser scanning, a three-dimensional model of the tracksite has been obtained (Figure 4). Applying photogrammetric techniques, 3D reconstructions of the selected tracks and ichnites [21] (Figure 5) have also been possible. Furthermore, by scanning different fossil specimens with the small object scanners, different 3D models have been obtained (Figure 6). Based on the digital reconstruction of the palaeontological material, a didactic proposal for geoscience education has been elaborated to support the integration of these results in the Palaeontological and Archaeological Interpretation Centre of Tamajón (CIPAT), as detailed below.

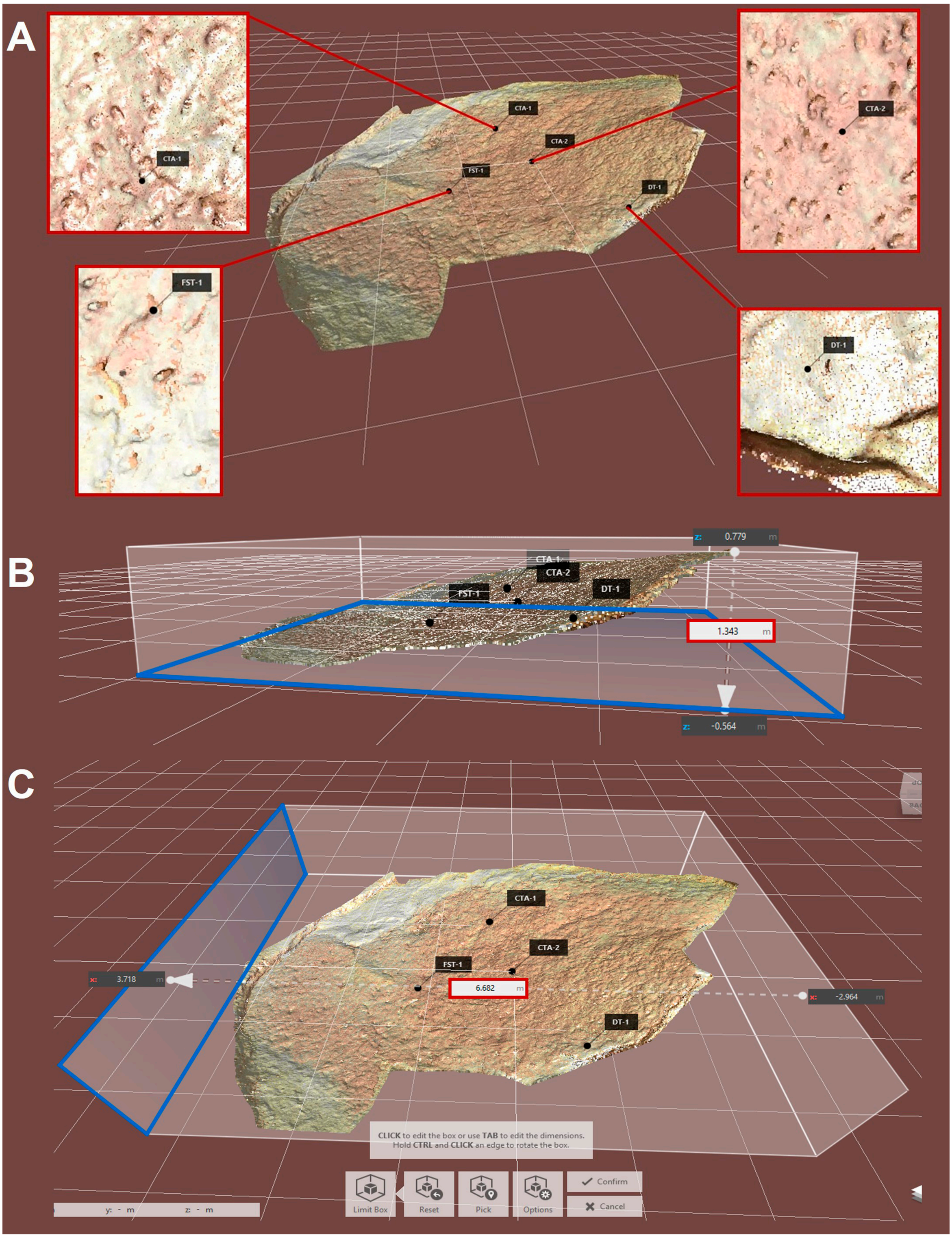

Figure 4. Three-dimensional model of the Upper Cretaceous track surface of Tamajón scanned with a phase-shift scanner. (**A**) Track surface and augmented view of the main crocodyliform tracks (top right and top left), small theropod print (bottom right), and fish fin trace *Undichna unisulca* (bottom left). (**B**) Lateral view of the tracksite. Total height (1.343 m) of the exposed channel surface. (**C**) Total length (6.662 m) of the exposed channel surface. Modified from [19].

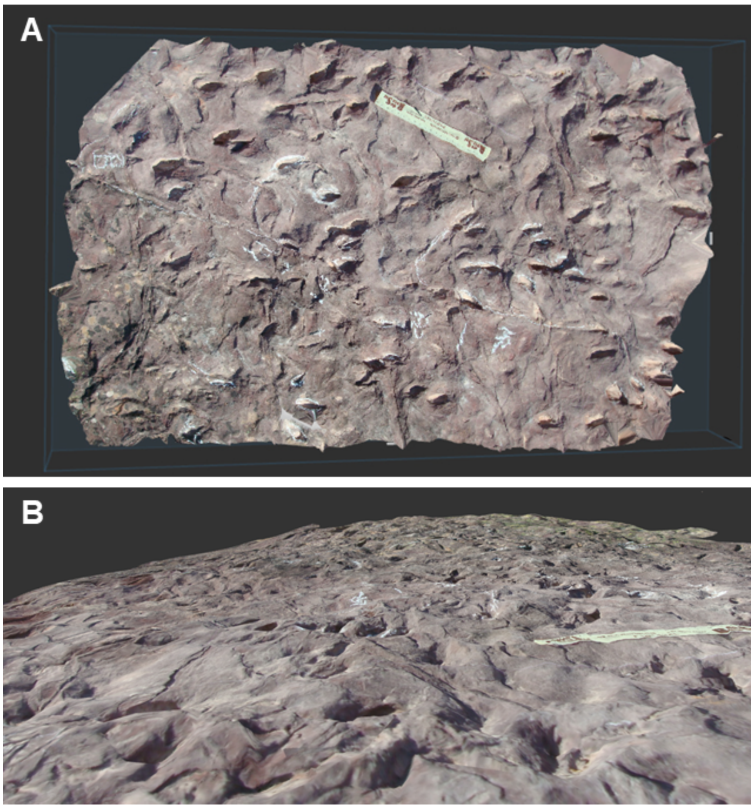

Figure 5. Photogrammetric three-dimensional modelling of the crocodyliform track CTA-2. (**A**) Top view of the crocodyliform track. (**B**) Detailed view of the negative relief of the crocodyliform track.

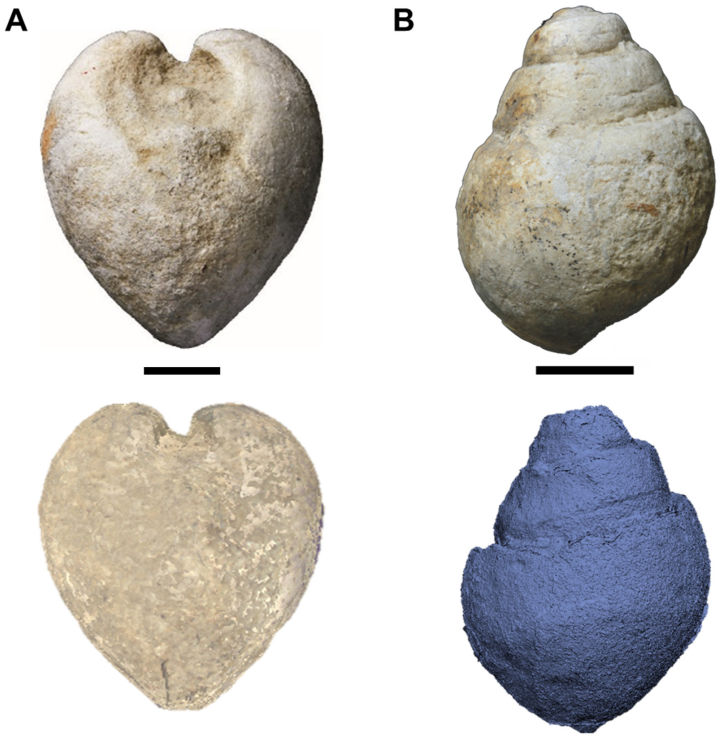

Figure 6. Three-dimensional models of the fossil casts of invertebrate specimens scanned with a small object scanner. (**A**) *Granocardium* (*Granocardium*) *productum* bivalve photograph (top view) and 3D model (bottom view). (**B**) *Tylostoma torrubiae* gastropod photograph (top view), and 3D model with "solid object" option (bottom view). Graphic scales: 1 cm.

4.1. Phase-Shift Laser Scanning

The processing and treatment of the on-site recollected data by means of a phase-shift scanner have resulted in a virtual 3D model that allows for permanent storage of the current state of the tracksite (Figure 4). The reconstruction shows the real dimensions of the exposed channel surface (length, width, and depth) along with the coordinates of each ichnite (Figure 4A). It also allows for automatically measuring the distance between any chosen points of the surface. Among the results, it is possible to clearly observe both planes of the track surface, as the program used allows 360° movement around the scanned area (Figure 4B,C). By observing both planes of the surface, diverse options to examine and study the ichnites are found from above (concave epireliefs) or from below (convex hyporeliefs). The latter is the virtual cast generated by the scanner, making it possible to measure the depth and shape of each of the ichnites. The utilized program also integrates the possibility to mark different points over the site, allowing the addition of notes, images, and photographs, creating a database and easing the exchange of the registered information with other users.

This digital reconstruction is currently being used to study in detail the ichnites and other non-biogenic sedimentary structures, to measure length, interdigital angles, and depth of prints, helping to identify new morphotypes that have not yet been described in this tracksite.

4.2. Photogrammetry

Regarding the resulting photogrammetric 3D models, various reconstructions have been obtained (e.g., Figure 5), where the main crocodyliform tracks (CTA-1, CTA-2) are represented, along with the ichnite of a small theropod (DT-1) and the swimming track of a fish, assigned to *Undichna unisulca* (FST-1). The program "ReCap Photo" allows one to view the surface of the prints in a full 360° view, making it possible to measure depth and angles, in addition to establishing scales, colouring functions, distortion, and mesh.

4.3. Small Object Scanning

The utilization of a small object scanner has allowed for the digitalization of the selected invertebrate fossil samples, recollected from the Upper Cretaceous marine sites of Figueira da Foz (Portugal) and Tamajón (Spain). The resulting 3D models show the real colouring as well as the complete and detailed external morphology that can be observed in a 360° view (Figure 6). Furthermore, applying the different visualization options, once the model is completed and finished, allows for in-depth study of the morphological details of the fossils, including their skeletal parts and inner or outer casts, thus providing useful additional information to the study of these samples.

The three-dimensional models will be used for a virtual 3D online repository as well as allowing 3D printing of these invertebrate samples, useful for both scientific and learning purposes and avoiding a potential deterioration of the originals due to repeated hands-on procedures.

4.4. Geoscience Education

The didactic activities designed for this project are presented as a set of file cards for a practical, dynamic use and understanding for different educational contexts, organized by complexity due to the abstraction level needed in each case. This can be observed by the recommended age of the participants in each activity. Before starting the sequence, the activity "Palaeontology vs. Archaeology" should be developed, by using the Spanish utility model "Interactive Didactic Panel—Diferencia2" (registration number ES1268764) [37], which helps to clarify, by considering previous knowledge, the difference between both disciplines and their main object of study.

The proposed activities have been titled "The Fossil Hunt" (Appendix A), "Cretaceous beach" (Appendix B), "Following Tami´s tracks" (Appendix C), and "Discovering the Tracksite of Tamajón" (Appendix D). Each file card includes the title of the activity, the recommended age of participants, the objectives to be achieved, the multiple intelligences, and the European Union (EU) key competences covered, along with the needed resources, the sequence of the activity, and some further observations (Figures 7 and 8).

Figure 7. Sample of didactic activities. (**A**) Photograph of an *in situ* ammonite (red dashed circle) at the Figueira da Foz Site (Portugal) for the activity "The Fossil Hunt" (Appendix A). (**B**) Photograph of an *in situ* coral fragment (red dashed circle) at the Figueira da Foz site (Portugal) for the same activity. (**C**) Image of the online/virtual activity "Cretaceous beach" (Appendix B), showing two levels of difficulty regarding the name of the specimen.

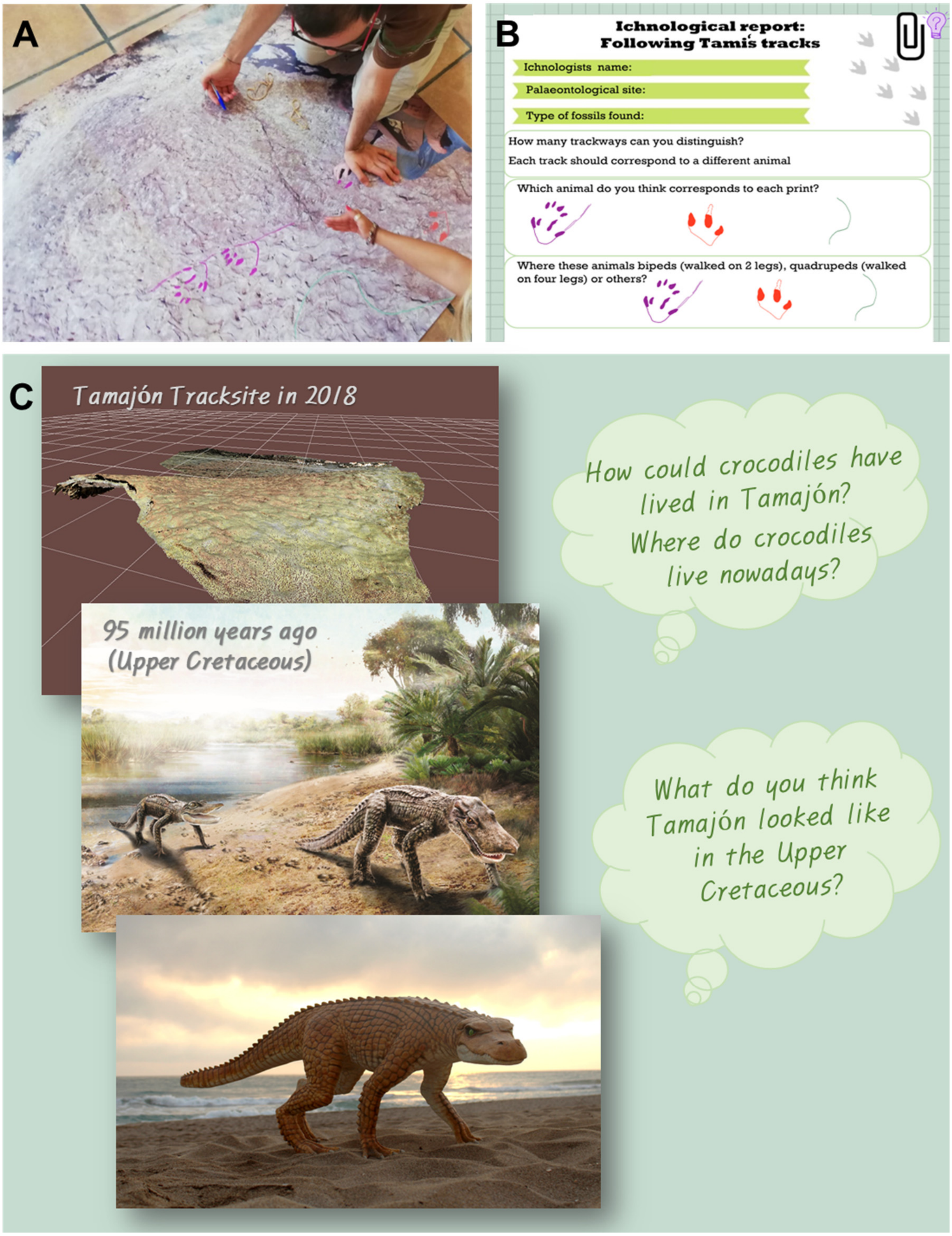

Figure 8. Examples of some of the proposed didactic activities. (**A**) Track surface mat for the activity "Following Tami´s tracks". (**B**) Ichnological report for the activity "Following Tami´s tracks" (Appendix C). (**C**) Palaeobiological sample of the activity "Discovering the Tracksite of Tamajón" (Appendix D) where different questions are aroused to strengthen scientific thinking and reasoning.

5. Discussion

Palaeontological sites can be used as highly adequate spaces for the out-of-school learning of geosciences in general, and Earth history in particular. In this way, the Cenomanian–Turonian (Upper Cretaceous) outcrops of Figueira da Foz (Portugal) and Tamajón (Spain) demonstrate that the combination of different virtual palaeontology techniques is an asset to the scientific study of the palaeontological sites, allowing the implementation of transdisciplinary didactic activities for different educational levels and the general public. Furthermore, 3D techniques, such as phase-shift scanning, photogrammetry, and small object scanning, have been successful for the digital recording of the vertebrate tracksite of Tamajón and invertebrate fossil specimens of both Iberian sites, contributing to the deepening of scientific studies beyond the traditional methods.

Three-dimensional reconstructions facilitate the study and comparison of fossils without a direct or excessive manipulation of samples, facilitating long-lasting conservation of the fossil specimens at their corresponding Portuguese or Spanish institution. It is also an effective way to replace the traditional use of replicas or physical models for morphological studies, e.g., [50]. This aspect also enhances collaborative research throughout the globe [51], facilitating, in this case, Iberian cooperation strategies between two neighbouring countries with many common geological and historical traits. Regarding traditional methods for ichnite and track surface studies (detailed drawings, in situ casts, etc.), these can lead to the loss of scientific information, which hinders ichnotaxa comparison [33] and is usually technically complex and expensive. Therefore, digital 3D recording by means of laser scanning and photogrammetry techniques is an adequate alternative for these detailed ichnite studies, facilitating the systematic classification of the high abundancy of prints and tracks of the track surface of Tamajón, allowing the coverage of the site and avoiding its deterioration.

Digital recording also allows for the protection of didactic and outreach values of this important palaeontological heritage and facilitates its transposition to different social groups (e.g., scientific, educational, or geotouristic). For this matter, these digital reconstructions will be incorporated in a virtual repository of the Palaeontological and Archaeological Interpretation Centre of Tamajón (CIPAT), expanding inclusion possibilities and attending to diversity and the possibilities of different sectors of society and institutions. These data are also essential for the 3D printing of precise replicas of the ichnites, tracks, and even the tracksite at various scales, as well as of the marine fossil samples of the studied Iberian Upper Cretaceous sites.

Furthermore, 3D modelling has also allowed for the design and development of several didactic activities for the Didactic Area of the CIPAT, aimed at different educational levels and the general public. To base these activities on the multiple intelligence theory proved to be beneficial for the teaching–learning process, as it stimulates meaningful learning (*sensu* [43]) as well as prompting self-esteem, which is directly related to an increment on motivation in learning.

These didactic activities have been designed to help participants understand the relevance of palaeontology as a scientific discipline of geosciences with a strong interdisciplinary scope, showing in a diversity of ways how scientific reasoning is integrated within these extraordinary findings and how the Earth's systems have evolved during millions of years. Among the main objectives, the understanding of the geological dimension of time (geological time) is essential; therefore, guiding participants to adequately arrange these abstract concepts is crucial to allow the cognitive construction of correct scientific knowledge throughout long life learning, which is essential for the understanding of the world we live in. The work carried out here also aims to contribute to improving the design and development of didactic sequences for out-of-school education at these sites [8], organizing effective transdisciplinary teaching tools, developing awareness, values, and responsibility towards the natural heritage of these territories.

Therefore, by the research covered in this project, it is suggested that geoeducation can be managed at rich geological points and interpretation centres, which may not be necessarily part of geoparks, such as the studied examples of the palaeontological sites of Figueira da Foz and Tamajón and the CIPAT. These sites are adequate in situ geoeducation points which harbour interesting local, regional, and even international natural elements useful for learning natural science through palaeontological content and its related lithologies and sedimentary structures. Thus, it becomes even clearer that geoeducation constitutes the main tool to transmit knowledge and, at the same time, to emphasize the importance of geoheritage and geoconservation [4].

As a whole, this work aims to contribute to the emerging topic of geoeducation through out-of-school meaningful learning experiences, demonstrating the benefits of presenting science as a transdisciplinary discipline and allowing it to be more accessible among society.

6. Conclusions

On the bases of the above, it is highly important to adopt more strategies that make geoeducation widely available, not only for students of different educational levels but also for the general public. This includes the learning of palaeontology and the history of the Earth through several formal and non-formal activities explored in fieldwork contexts and interpretation centres, such as those exemplified in this work. Both topics and specifically designed activities also should be better integrated into special curricula programs at various primary and secondary school levels. In this way, there will be a major opportunity for future citizens to be informed about issues that raise geological and cultural interest [4], some of them belonging to the geological heritage of their living places and localities and municipalities. As a whole, these activities aim to cover geoeducation through the benefits of a multicultural perspective of international cooperation by making science understandable, achievable, and pursuable.

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Appendix A

File card of "The Fossil Hunt". Multiple intelligences represented as symbols: linguistic–verbal; visual–spatial; bodily–kinaesthetic; interpersonal; naturalistic. European Union (EU) competences represented as coloured keys: mathematical competence and competence in science, technology, and engineering; literacy competence; personal, social, and learning to learn competence; citizenship competence; cultural awareness and expression competence.

The Fossil Hunt	
Recommended age	> 3 years old.
Objectives	To search for geological samples. To understand the study of geological processes. To be aware of the importance of Geoconservation.
Multiple Intelligences	
EU Key competences	
Resources	"Fossil Hunt guide". Support material for explanations (optional).
Development	Participants will be handed out the Fossil Hunt guide to start with the search of *in situ* fossil samples. Once one has been found, they must complete the Fossil Hunt guide by answering the different questions and take a picture or make a drawing of their findings. Special attention should be given to the importance of protecting Natural Heritage and Geoconservation, as the fossil sample must not be recollected. The activity can be done individually, in pairs or groups.
Further observations	The Fossil Hunt guide has been designed to be used both, digitally and printed. The Fossil Hunt guide is based on Bloom's Taxonomy, allowing to adapt to different educational levels and low and high order thinking skills. Several versions of the Fossil Hunt guide can be designed by choosing preferential activities for set groups.

Appendix B

File card of "Cretaceous beach". Multiple intelligences represented as symbols: linguistic–verbal; visual–spatial; intrapersonal. European Union (EU) competences represented as coloured keys: mathematical competence and competence in science, technology, and engineering; personal, social, and learning to learn competence; digital competence.

Cretaceous beach	
Recommended age	> 5 years old.
Objetives	To use critical thinking to infer in which type of sedimentary environment could each palaeobiological entity have lived in.
Multiple intelligences	
EU Key competences	
Resources	Interactive online game. Support material for explanations (optional).
Development	The aim of the game is to drag the Upper Cretaceous fossils, to their corresponding sedimentary environment. If it is correct, the fossil will turn into its palaeobiological entity.
Further observations	To adapt it to different levels, there are three versions of the game. The first version only differentiates general environments (*e.g.*, open ocean) for younger ages. The level of complexity of the other two differs in the specific name of the fossils, scientific name (*e.g.*, *Hemiaster bufo*) or common name (*e.g.*, sea urchin). In this way, the advanced version will have the specific names, adequate for university levels.

Appendix C

File card of "Following Tami's tracks". Multiple intelligences represented as symbols: visual–spatial; logical–mathematical; interpersonal. European Union (EU) competences represented as coloured keys: mathematical competence and competence in science, technology, and engineering; literacy competence; personal, social, and learning to learn competence.

Following Tami's tracks	
Recommended age	> 7 years old.
Objectives	To know about ichnologists work methodology. To be aware of the variety of information fossilized prints can provide. Extract palaeontological knowledge from a simplified reconstruction of the Tamajón tracksite.
Multiple intelligences	
EU Key competences	
Resources	Tracksurface mat (Fig. 8A), "Ichnological report". Measuring instruments (ruler or measuring tape).
Development	The tracksurface mat must be placed on the floor. Then a teaching agent broadly explains the importance of ichnology, as tracks can give different information than other fossil samples. By means of scaffolding techniques, teaching agents should guide participants to complete the Ichnological report by discussing in group, encouraging critical thinking. For some questions, participants will have to measure several parameters to correctly answer their questions, contrasting scientifically their inferences.
Further observations	The Ichnological report has been designed to be used both, digitally and printed. To extend the activity, a previous explanation can take place, regarding the fossilization process of ichnites and different types of impressions (print, subimpression, cast) by using 3D printed models of the digitalized ichnites, as well as explaining the relevance of these "Galloping crocs".

Appendix D

File card of "Discovering the Tracksite of Tamajón". CIPAT: Palaeontological and Archaeological Interpretation Centre of Tamajón (Spain). Multiple intelligences represented as symbols: linguistic–verbal; visual–spatial; interpersonal. European Union (EU) competences represented as coloured keys: mathematical competence and competence in science, technology, and engineering; personal, social, and learning to learn competence; citizenship competence; cultural awareness and expression competence; digital competence.

Discovering the Tracksite of Tamajón	
Recommended age	> 3 years old.
Objectives	To obtain a joint and integrative vision regarding the tracksite exposition at the Palaeontological Area of the CIPAT. To understand how a same area has changed over millions of years of Geological influence.
Multiple Intelligences	
EU Key competences	
Resources	Video of the 3D reconstruction of the tracksite of Tamajón.
Development	The video allows to observe the totality of the digital 3D model obtained by the scanning of the tracksurface of Tamajón. Allowing everyone to have digital access to the site, as it is currently covered to avoid spoliation, deterioration, and to enable future studies onsite as well as its preservation. In addition, different questions will be popping up throughout the video, to encourage critical thinking and scientific literacy. Visitors can answer and debate with others about their thoughts on the topic.
Further observations	It can also be used as visual support for palaeontological explanations regarding the CIPAT, and for the activity "Following Tami's tracks". It can also be used interactively by means of tablets or other digital supports, allowing visitors to interact with this extraordinary palaeontological tracksite.

References

1. Gould, S.J. *Time's Arrow, Time's Cycle: Myth and Metaphor in the Discovery of Geological Time*; Harvard University Press: Cambridge, UK, 1987.
2. Rudwick, M.J.S. *Worlds Before Adam: The Reconstruction of Geohistory in the Age of Reform*; University of Chicago Press: Chicago, IL, USA, 2010.
3. Sande, A.; Burr, J.J.; Chiment, W.D.; Allmon, J.; Keith, R. A Problematic Fossil Brings Paleontology to the Classroom and the World. *J. Geo. Sci. Ed.* **2003**, *5*, 361–364.
4. Zafeiropoulos, G.; Drinia, H.; Antonarakou, A.; Zouros, N. From Geoheritage to Geoeducation, Geoethics and Geotourism: A Critical Evaluation of the Greek Region. *Geoscience* **2021**, *11*, 381. [CrossRef]
5. Bezzi, A. What is this thing called geoscience? Epistemological dimensions elicited with the repertory grid and their implications for scientific literacy. *Sci. Educ.* **1999**, *83*, 675–700.
6. Orion, N. A Holistic Approach for Science Education for All. *Eurasia J. Math. Sci. Technol. Ed.* **2007**, *3*, 111–118. [CrossRef]
7. Jolley, A.; Kennedy, B.M.; Brogt, E.; Hampton, S.J.; Fraser, L. Are we there yet? Sense of place and the student experience on roadside and situated geology field trips. *Geosphere* **2018**, *14*, 651–667.

8. Ozkaya de Juanas, S.; Barroso-Barcenilla, F.; Callapez, P.M.; Carvalho, P.C.S.; Lopes, F.C.; dos Santos, V.F. Descubriendo yacimientos del Cretácico de España y Portugal: Un proyecto educativo para el aprendizaje de las Ciencias de la Tierra fuera del aula. In *A Holistic View of Earth and Space in Its Human and Natural Aspects a Tribute to Professor Celeste Romualdo Gomes*; Centro de Investigação da Terra e do Espaço da Universidade de Coimbra: Coimbra, Portugal, 2020; Volume 2, pp. 613–634.
9. Ozkaya de Juanas, S.; Barroso-Barcenilla, F.; Callapez, P.M. Didactic and outreach possibilities of the Cretaceous palaeontological site Figueira da Foz (Portugal). *Comun. Geol.* **2021**, *108*, 125–130.
10. Blasi, I.C.; Pellicer, X.P.; Poch, J.; Galobart, À. Open-air paleontological sites: A dissemination opportunity and a risk to spoliation. A case study in the Orígens Geopark, Spain. *Geoconservation Res.* **2021**, *4*, 513–523.
11. Paik, I.S.; Huh, M.; Kim, H.J.; Kim, S.J.; Newsome, D. The Cretaceous fossil sites of South Korea identifying geosites, science and Geotourism. In *Geotourism: The Tourism of Geology and Landscape*; Newsome, D., Dowling, R.K., Eds.; Goodfellow Publishers: Oxford, UK, 2010.
12. Skelton, P.W.; Spicer, R.A.; Kelley, S.P.; Gilmour, I. *The Cretaceous World*; Cambridge University Press: Cambridge, UK, 2003.
13. Callapez, P.M.; Barroso-Barcenilla, F.; Soares, A.F.; Segura, M.; dos Santos, V.F. On the co-occurrence of Rubroceras and Vascoceras (Ammonoidea, Vascoceratidae) in the upper Cenomanian of the West Portuguese Carbonate Platform. *Cretac. Res.* **2018**, *88*, 325–336. [CrossRef]
14. Callapez, P.M.; Brandão, J.M.; dos Santos, V.F.; Gomes, C.R. Between history and contemporaneous geology: Revisiting a "classical" (geo) site from the Upper Cretaceous of Portugal. *Rev. Soc. Geol.* **2013**, *26*, 5–12.
15. Ozkaya de Juanas, S.; Alcalde-Fuentes, M.R.; Audije-Gil, J.; Barroso-Barcenilla, F.; Berrocal-Casero, M.; Callapez, P.M.; Pérez-Valera, J.A.; dos Santos, V.F.; Segura, M. Discovering the Cretaceous Life at the Didactic Area of the Palaeontological and Archaeological Interpretation Centre of Tamajón, CIPAT (Guadalajara, Spain). *Lucas Mallada* **2021**, *23*, 123–124.
16. Barroso-Barcenilla, F.; Goy, A.; Segura, M. Ammonite zonation of the Upper Cenomanian and Lower Turonian in the Iberian Trough, Spain. *Newsl. Stratigr.* **2009**, *43*, 139–164. [CrossRef]
17. Barroso-Barcenilla, F.; Callapez, P.M.; Ferreira Soares, A.; Segura, M. Cephalopod assemblages and depositional sequences from the upper Cenomanian and lower Turonian of the Iberian Peninsula (Spain and Portugal). *J. Iber. Geol.* **2011**, *37*, 9–28.
18. Barroso-Barcenilla, F.; Audije-Gil, J.; Berrocal-Casero, M.; Callapez, P.M.; Carenas, B.; Comas-Rengifo, M.J.; García Joral, F.; García-Hidalgo, J.F.; Gil-Gil, J.; Goy, A.; et al. El Cenomaniense-Turoniense de Tamajón (Guadalajara, España): Contexto geológico, contenido fósil e interpretación paleoambiental. *Bol. R. Soc. Esp. Hist. Nat. Sec. Geol.* **2017**, *111*, 67–84.
19. Berrocal-Casero, M. Los ecosistemas del Cretácico de Guadalajara: De la costa al mar. **2022** *Serv. Pub. Dip. Prov. Guadalajara. in press*.
20. Aguilar, M.J.; Ramírez del Pozo, J.; Riba, O. Algunas precisiones sobre la sedimentación y paleoecología del Cretácico inferior en la zona de Utrillas-Villarroya de los Pinares (Teruel). *Estud. Geol.* **1971**, *27*, 497–512.
21. Segura, M.; Barroso-Barcenilla, F.; Berrocal-Casero, M.; Castanera, D.; García-Hidalgo, J.F.; dos Santos, V.F. A new Cenomanian vertebrate tracksite at Tamajón (Guadalajara, Spain): Palaeoichnology and palaeoenvironmental implications. *Cretac. Res.* **2016**, *57*, 508–518. [CrossRef]
22. Vilas, L.; Mas, J.R.; García, A.; Arias, C.; Alonso, A.; Meléndez, N.; Rincón, R. Ibérica Suroccidental. In *El Cretácico de España*; García, Á., Ed.; Universidad Complutense de Madrid: Madrid, Spain, 1982; pp. 457–514.
23. Floquet, M.; Alonso, A.; Meléndez, A. El Cretácico Superior de Cameros-Castilla. In *El Cretácico de España*; García, Á., Ed.; Universidad Complutense de Madrid: Madrid, Spain, 1982; pp. 387–456.
24. Dos Santos, V.F.; Alcalde-Fuentes, M.R.; Audije-Gil, J.; Barroso-Barcenilla, F.; Berrocal-Casero, M.; Callapez, P.M.; Ozkaya de Juanas, S.; Pérez-Valera, J.A.; Segura, M. "Galloping Crocs" in the Upper Cretaceous of Tamajón (Guadalajara, Spain)? *Res. XXIV Bien. R. Soc. Esp. Hist. Nat. Sec. Geol.* **2021**, *1*, 208–210.
25. Barroso-Barcenilla, F.; Alcalde-Fuentes, M.R.; Audije-Gil, J.; Berrocal-Casero, M.; Callapez, P.M.; Ozkaya de Juanas, S.; Pérez-Valera, J.A.; dos Santos, V.F.; Segura, M. Discovering a Project for the Development of Geotourism in Rural Areas: The Palaeontological and Archaoelogical Intepretation Centre of Tamajón (CIPAT, Guadalajara. Spain). *Land* **2022**, *11*, 444. [CrossRef]
26. Sutton, M.D.; Rahman, I.A.; Garwood, R.J. *Techniques for Virtual Palaeontology*; Wiley-Blackwell: Oxford, UK, 2014.
27. Lyons, P.D.; Rioux, M.; Patterson, R.T. Application of a three-dimensional color laser scanner to paleontology: An interactive model of a juvenile Tylosaurus sp. basisphenoid-basioccipital. *Palaeontol. Electron.* **2000**, *3*, 4A.
28. UNESCO. Arouca Declaration. Arouca Geopark, Documentation. 2011. Available online: http://aroucageopark.pt/es/documentacion/ (accessed on 25 November 2022).
29. Stoffelen, A.; Vannaste, D. An integrative geotourism approach: Bridging conflicts in tourism landscape research. *Tour. Geogr.* **2015**, *17*, 544–560. [CrossRef]
30. Peppoloni, S.; Di Capua, G. Geoethics: Ethical, social, and cultural values in geosciences research, practice, and education. In *Geoscience for the Public Good and Global Development: Toward a Sustainable Future*; Wessel, G.R., Greenberg, J.K., Eds.; Geological Society of America: Boulder, CO, USA, 2016; pp. 17–23.
31. Vasconcelos, C.; Torres, J.; Vasconcelos, L.; Moutinho, S. Sustainable development, and its connection to teaching Geoethics. *Episodes* **2016**, *39*, 509–517. [CrossRef]
32. Vasconcelos, C.; Ribeiro, T.; Cardoso, A.; Orion, N.; Ben-Shalom, R. Educational Theoretical framework underpinning geoethical resources. In *Teaching Geoethics: Resources for High Education*; U. Porto Edições: Porto, Portugal, 2020.
33. Remondino, F.; Rizzi, A.; Girardi, S. 3D Ichnology-Recovering Digital 3D Models of Dinosaur Footprints. *Photogramm. Rec.* **2010**, *25*, 266–282. [CrossRef]

34. Razzolini, N.L.; Vila, B.; Castanera, D.; Falkingham, P.L.; Barco, J.L.; Canudo, J.I.; Manning, P.L.; Galobart, A. Intra-trackway morphological variations due to substrate consistency: The El Frontal Dinosaur Tracksite (Lower Cretaceous, Spain). *PLoS ONE* **2014**, *9*, e93708. [CrossRef] [PubMed]
35. Orion, N. Earth Science education: From theory to practice, implementation of new teaching strategies in different learning environments. In *Geociências nos Currículos dos Ensinos Básico e Secundário*; Universidade de Aveiro: Aveiro, Portugal, 2001; pp. 93–114.
36. Gardner, H. *Frames of Mind: The Theory of Multiple Intelligences*; Basic Books: New York, NY, USA, 1993.
37. Ozkaya de Juanas, S.; Barroso-Barcenilla, F. Paleontología y su didáctica en Primaria: Diseño y aplicación de actividades basadas en yacimientos cretácicos y sus fósiles. *Bol. R. Soc. Esp. Hist. Nat. Sec. Aula.* **2019**, *6*, 95–113. [CrossRef]
38. Brown, J.S.; Collins, A.; Duguid, P. Situated cognition and the culture of learning. *Educ. Res.* **1989**, *18*, 32–42. [CrossRef]
39. Hendricks, C. Teaching causal reasoning through cognitive apprenticeship: What are results from situated learning? *J. Educ. Res.* **2001**, *94*, 302–311. [CrossRef]
40. Dewey, J.D. *How We Think*; D.C. Heath & CO: Boston, MA, USA, 1910.
41. DeWitt, J.; Osborne, J. Supporting teachers on science-focused school trips: Towards an integrated framework of theory and practice. *Int. J. Sci. Educ.* **2007**, *29*, 685–710. [CrossRef]
42. Paris, S.G. Situated motivation and informal learning. *J. Mus. Educ.* **1997**, *22*, 22–27. [CrossRef]
43. Ausubel, D.P. *Educational Psychology: A Cognitive View*; Holt, Rinehart & Winston: New York, NY, USA, 1968.
44. Krathwohl, D.R. A Revision of Bloom´s Taxonomy: An Overview. *Theory Pract.* **2022**, *41*, 212–218. [CrossRef]
45. EC—European Commission. Directorate-General for Education, Youth, Sport and Culture. In *Key Competences for Lifelong Learning*; Publications Office of the European Union: Luxembourg, Luxembourg, 2019.
46. UN—United Nations. Sustainable Development Goals. 2022. Available online: https://www.un.org/sustainabledevelopment/sustainable-development-goals (accessed on 2 December 2022).
47. Ozkaya de Juanas, S.; Audije-Gil, J.; Barroso-Barcenilla, F.; Berrocal-Casero, M.; Callapez, P.M.; Segura, M. "Paleosentidos": Descubriendo el Cretácico Superior de Tamajón (Guadalajara, España). In *Libro de Resúmenes del XX Simposio de la Enseñanza de la Geología*; AEPECT: Menorca, Spain, 2018; pp. 135–142.
48. Wood, D.J.; Bruner, J.S.; Ross, G. The role of tutoring in problem solving. *J. Child Psychol. Psychiatry* **1976**, *17*, 89–100. [CrossRef]
49. Askew, S. *Feedback for Learning*; Routledge: London, UK, 2000.
50. Friedrich, F.; Beutel, R.G. Micro-computer tomography and a renaissance of insect morphology. *Proc. SPIE Int. Soc. Opt. Eng.* **2008**, *7078*, 545–550.
51. Kuzminsky, S.C.; Gardiner, M.S. Three-Dimensional Laser Scanning: Potential Uses for Museum Conservation and Scientific Research. *J. Archaeol. Sci.* **2012**, *39*, 2744–2751. [CrossRef]