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## Galapagos - A virtual scientific field study for independent learners

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# **GALAPAGOS - A VIRTUAL SCIENTIFIC FIELD STUDY FOR INDEPENDENT LEARNERS**

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## **1. INTRODUCTION**

Multimedia CDROMs provide biologists with the new and exciting prospect of being able to send their undergraduate students to field sites that normally would be beyond their reach, by giving them a virtual field trip on their computer. A virtual field trip, on its own, would be new and challenging for us to design, but the computer environment provides us with the ability to give students practical experiences that they would not be able to get, even if they could visit the real place.

This project was designed to test a range of ideas for building a comprehensive scientific field trip to the Galapagos islands and then to complete a fully functional CDROM for use by students. In this example, we show the first trial version, the lessons that we learned from evaluating it, the changes that we have set out to make and the present state of development of the complete CDROM.

## **2. THE ACADEMIC BRIEF**

A full academic brief was developed for a CDROM about the study of evolution and speciation on the Galapagos islands. The structure of the exercises students were to perform was derived from a face-to-face session in which students used data sets and videotapes to answer questions posed about evolution and speciation. As the face-to-face session provided resources which students could refer to, a decision was taken to include on the CDROM, in the form of a resource library, as much material as possible that related to the questions students would address. It was intended, right from the start, that the resource library would also contain video of leading research scientists talking about the ideas and concepts covered by the CDROM, under the title of 'Expert Witnesses'. Plans for the CDROM included the

provision of an integrated ClarisWorks package to provide spreadsheet and word-processing tools.

### **3. PRODUCTION OF A PROTOTYPE**

The academic brief was converted into a working version of the CDROM, programmed in Macromedia Director. At this stage some of the available assets (video, stills, sound, graphics and text) were included so that the prototype could be evaluated with some student volunteers.

The CDROM trialled a number of innovations, including a taxonomic exercise using specially shot stills and footage of the actual museum specimens collected from the islands by Charles Darwin in 1835, during his voyage around the world on HMS Beagle. Students retraced the process of scientific investigation that was carried out on these specimens after Darwin returned from his journey.

In addition to trialling the academic content, a number of different technical solutions to the presentation of images and sound were tested and tests were done on the optimum production routes for sound and video. The main structure of the CDROM was a series of exercises that were designed to be tackled sequentially, linked by 'linear sequences' of a mixture of images, both moving and still, with a commentary.

### **3. EVALUATION**

The prototype was evaluated using students who would normally at that time be studying the same material presented by text and face-to face tutorials. In the face-to-face sessions students normally work in syndicates and can discuss the data available to them, in order to come up with a group answer to each of the questions posed. In the evaluation, students worked in pairs and were recorded on video, with a live microphone, in addition to being scored by an observer. Two reports based on this evaluation are now available. Students were a lot less able than anticipated and the use of spreadsheets for recording data was not a success. The linear sequences that linked successive exercises were considered to be too long. The interface, though simple, was not intuitive and some students never found the great wealth of information available to them in the resources library. Those that did make use of the resources library spent a lot of time looking at the stills and video and all the students were enthusiastic about the use of images throughout the CDROM.

The making of the prototype CDROM and the educational philosophy behind it is described in a videotape.

### **4. CONSTRUCTING A FULL VERSION OF THE CDROM**

To create a large resource library, without problems of copyright, location shooting of stills and film on the Galapagos islands, including Quick Time VR sequences, was planned for

1996. The general academic structure of the prototype was thought to be sufficiently robust to form the basis for the new version and resources were obtained with that in mind.

After the location work, a revised academic brief was developed for the final version of the CDROM, making use of all the new material obtained. This brief was very detailed and included, for example, all the interactive exercises, self-assessment questions with feedback and commentary . This brief is now being used for the full version of the CDROM. A new interface has been developed, based around the cabin of a ship that is visiting the islands in the archipelago. The cabin contains the resources that students need to access and instructions for what to do on each island that they visit.

A number of additional sequences have been shot in which research scientists reminisce about the islands themselves and the scientific research that has gone on in the archipelago.

## **5. THE FUTURE**

The CDROM is due to be completed in November 1997, for despatch to students in March 1998. It will provide about 4 hours of planned student study time, although students who wish to explore all the resources available will undoubtedly spend longer studying it. Before final release, another evaluation will have been carried out, using volunteer students who studied evolution and speciation during the 1997 academic year. The evaluation will concentrate on functionality, with a further evaluation for educational effectiveness taking place during the 1998 academic year.