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This article reports on the achievements of the joint research project "Global Digital Museum for Museum Education on the Internet," which was carried out by four institutions: the National Museum of Ethnology, Osaka, Japan; the British Museum, London, UK; Cornell University, Ithaca, USA, and IBM Japan Ltd., Tokyo, Japan. These four institutions had specific roles in this international and multi-disciplinary collaborative work in order to achieve their goals in the time period between September, 1995 and March, 1999. Dr.Prof. Shigeharu Sugita of the National Museum of Ethnology was representative to the project, and he lead the project members of the museum. Leaders at the British Museum was Mr. John Reeve, Dr.Prof. Geraldine Gay was the leader at Cornell University, and Dr. Jung-Kook Hong was the leader at IBM Corp.

This collaborative work was initiated by the National Museum of Ethnology and Tokyo Research Laboratory of IBM Japan. Then the Education Service of the British Museum (currently the Education Department, The British Museum) and the Interactive Multimedia Group (currently the Human Computer Interaction Group) of Cornell University joined them to share their respective areas of expertise. Since 1986, the National Museum of Ethnology and Tokyo Research Laboratory of IBM Japan have been jointly working on advanced computer technology applications in the museum and in ethnological studies, including full color image storage and retrieval for the museum artifact collections, and multimedia for museum exhibitions. As a result of the achievements and experience gained from this joint work, the two institutions recognized the importance of the social role of the museum as a global information dissemination center and the advantages of the World Wide Web, which was about to expand explosively. As a natural consequence of this, two institutions set the next project focus on museum education, and information services. Two advanced technologies —multimedia and the Internet— are used as the key technologies for this project, as well as the particular skills of museum education. The British Museum and Cornell University are leading institutions in the educational domain for schools, adult learners and museums, and they already have significant experience and achievements that compliment the skills of the National Museum of Ethnology and Tokyo Research Laboratory of IBM Japan.

Museum education is a user-centered teaching style compared to conventional school education; people can ideally learn by directly accessing exhibits at their own pace, according to their own interests. Interactive multimedia technology enhances museum education by providing the benefits of digital convergence technology in handling

data. The combination of multimedia technology with networks such as the Internet enhances the educational experience considerably and expands it to a worldwide scale.

There is growing demand for interactive access to the large number of museum multimedia collections on the Internet. Especially, the information should be provided as a cross-cultural reference; the information about one museum should complement the information from others. The user wants to collect information without specifying site names, or file names, or repeating the search in turn. Museum education experts and schoolteachers expect Internet use to grow and eventually rival conventional paper-based teaching materials, by facilitating interactive hypermedia technology on the Internet. They need a framework and tools for creating theme-oriented teaching materials using multimedia. Museum education systems on the Internet should be well organized and possess effective search and educational tools for new kinds of use by novice users.

Studying these questions was the focus for the joint work of the Global Digital Museum (GDM) project. GDM is a virtual global classroom on the Internet, in which users can search and access museum information in a single user-friendly interface, as though the contents were part of a single federated museum. GDM intends to define a framework for collaborative museum education by providing a multimedia content-editing facility, exchanging the content beyond the Internet, as well as providing global search facilities. We made prototype to test its feasibility for the two museums in Osaka and London by involving schoolteachers and children. Their feedback was then analyzed by education experts.

The respective strengths of each institution were pooled to help us achieve the goals of the project. The National Museum of Ethnology is substantially computerized and is experienced in computer applications in both museum operations and ethnological research. The Education Service of the British Museum is highly experienced in museum education, and in the creation and use of teacher materials, such as resource packs. The Interactive Multimedia Group of Cornell University has expertise in the educational uses of interactive multimedia technology and the Internet. Tokyo Research Laboratory of IBM Japan has advanced computer technology, and has been working on digital museum projects with National Museum of Ethnology for more than ten years.

This report assembles the papers contributed from all the GDM project members at the four organizations reflecting the total scope of our joint effort in the GDM project. Some of the papers explain details of concept and technology of the GDM prototype. Other papers describe the background to the GDM project and related concepts of museum education development. We discussed these at joint workshops that we held several times during the project by bringing together GDM members from the UK, USA and Japan. We hope to share with our readers both the technical achievements

and our experience of museum education over the Internet and multimedia technology, which we gained from GDM prototyping. We also hope that our trial and report contribute to promoting the use of the Internet and multimedia in museums to enhance museum education.

Finally, we would like to express our deep gratitude to all GDM members and supporters at the National Museum of Ethnology, the British Museum, Cornell University and IBM Japan for their enthusiasm and commitment to our joint work, which they showed from the outset.

Editors