INTERACTIVE VIDEODISC TECHNOLOGY AND MICROCOMPUTERS:
A CASE PRESENTATION ON PROJECT EMPEROR-I

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"The First Emperor of China", a set of two double-sided
NTSC CAV videodiscs,   - the first product of PROJECT
EMPEROR-I: China's Treasure Revealed via Videodisc
Technology - will be used to illustrate fully the
enormous potential of interactive videodisc technology
including fast, random and online access to a huge,
multi-media information bank; and opportunities for
research, education and training.

INTRODUCTION

Chen in her recent overview article titled "Micro-based
Videodisc Applications" (1985) discussed that the recent dynamic
and explosive development in microcomputer and related high tech
areas has created great potentials for videodisc technology,
which were unattainable before.   Vidoedisc technology has been
with us longer than microcomputer, however until recently, it has
been limited in applications and has been mostly applied in
recreation and entertainment areas.   However, when combined
interactively with computers, particularly with low-cost high-
performance microcomputers, the potential for information
transfer is boundless.   PROJECT EMPEROR-I can serve as a perfect
illustration.

PROJECT EMPEROR-I: China's Treasure Revealed via Videodisc
Technology is a major research and development project supported
mainly by the Humanities Project in Libraries, US National
Endowment for the Humanities (NEH).   It applies the latest in
videodisc technology in presenting and interpreting a major
historical/archaeological period of China's past.   The site and
artifacts recorded and presented are from the period of the First
Emperor of China.   During the Emperor's brief fifteen-year reign,
his accomplishments included the institution of unified written
scripts, the completion of the Great Wall, the unification of
warring states, and the building of his magnificent tomb near
Xian.   The discovery of the 7,000 life-size terra-cotta figures
of warriors and horses near his tomb has been considered as one
of the most magnificent and significant archaeological finds in
this century, and thus captured the fascination of thousands and
thousands of people all over the world (see Figure 1).   PROJECT
EMPEROR-I intends to present and interpret these fascinating
subjects via interactive videodisc technology. The first product
of PROJECT EMPEROR-I is a set of two double-sided NTSC CAV
videodiscs, based on which electronic database of selected visual
images is being constructed and computerized coursewares are
being developed for various levels of potential users.   As a

Courtesy of PROJECT EMPEROR-I

result, any system user will be able to utilize the videodisc and the database interactively with a microcomputer at his/her own pace and with his/her own selection from the menus.

WHY VIDEODISC FOR PROJECT EMPEROR-I?

Optical videodisc technology holds great promise for information storage and retrieval because of its high density storage capacity (108,000 frames of visual images for a two-sided analog disc and with one-hour dual sound tracks) and quick random access of stored information (about 1.5 to 3 seconds to search any one of the 54,000 frames of images on each side of the disc.) However, for PROJECT EMPEROR-I, in addition to these features, videodisc is also an idea medium to enable us to capture and present the magnificant site of the archaeological find and related artifacts in multi-media formats, both visual and audio, and with high resolution of color and graphic presentations. Furthermore, it is a perfect archival medium which enables us to create a most comprehensive electronic multi-media information bank on the subject in the world. Last but not the least, it enables us to create innovative and interactive programs with microcomputer for achieving a new mode of education and research in fascinating areas of humanities such as ours.

OBJECTIVES

PROJECT EMPEROR-I 'is unique in that it is a project that brings together the East and the West, the past and the present, humanities and high tech, and scholarship and applications. Not only it demonstrates how new technologies can help to enhance better understanding and appreciation of humanities by delivering enormous multi-media, multi-formatted and multi-dimensional information in a way not possible before, but also it introduces a new interactive educational and learning model. These visual, audio and textual information on videodisc, when used interactively with a micro-based system with developed coursewares, the system user can consume, enjoy and digest these online information at his/her own pace and choice.

CONTENTS OF "THE FIRST EMPEROR OF CHINA"

PROJECT EMPEROR-I's initial product is a set of two 12" NTSC CAV videodiscs, entitled "The First Emperor of China: Qin Shi Huang Di, 秦始皇帝 ." Each two-sided disc contains 108,000 frames of visual images and one hour of audio tracks with narration and/or interviews in both English and Chinese, together with musical interludes. Sides 1 and 2 (the first disc) include over 200 segments of motion video from films and videotapes, and over 4,000 still frame slides. These visual information together with matching narrations in both English and Chinese are generally arranged in "chapters" like an electronic book, with each chapter deals with an identifiable topic, such as "Introduction on the First Emperor of China," "The Great Wall," and "Collection of the Qin Terra-Cotta Museum of Warriors and Horses." Thus, visual and audio information can be retrieved quickly by either chapter or frame search. Sides 3 and 4 (the second disc) contains essential oral history information. They are videotaped interviews with ten world top-most subject experts on the subject. Both visual and audio information are arranged again in chapters by questions asked of each expert.

While the discs are not intended to be stand-alone products, they do contain at least three short stand-alone pieces which can be either accessed linearly by playing the discs as Level One products or interactively selected from the displayed menus at the microcomputer system through the use of the developed coursewares. These three introductions are on the following:

● The First Emperor of China (about 8 minutes);
● The Great Wall (about 5 minutes);
● The Excavation of the Terra-Cotta Figures (about 5 minutes).

ELECTRONIC DATABASE

A comprehensive database is being constructed for those selected visual images on the videodiscs, which are deemed necessary by the project researchers. Each record will include approximately a dozen of fields, such as disc side number, frame number, type of object, date of object, size of object, material of object, date of discovery, site where discovered, current location of object, information source, publication source, and comments. These will permit one to interactively and

simultaneously retrieve the desired textual, visual and audio information by using a micro-based interactive videodisc system, such as the Digital Equipment Corporation's Interactive Video Information System (IVIS), two sets of which were donated to us by DEC, and/or other popular system configurations. The system configuration of our present IVIS is a DEC Pro-350 microcomputer with 512-KB RAM (expandable to 1-MB) and 10-MB hard disc; and a SONY LDP-1000A videodisc player. The newer IVIS is a DEC Pro-380, which is even more powerful than our present configuration.

COURSEWARES

    Several computer-assisted instructional coursewares using our videodiscs with DEC's IVIS system are being designed for various levels of users depending on their knowledge on the subject fields of Chinese art history and archaeology. At each given level, several computer assisted instructional lessons will be devised for the interactive system users, who will be led through each lesson step by step with the choices made from both the menus and sub-menus presented to them on the monitor screen. Concurrently, the desired visual, audio and textual information in whatever combinations selected by each system user will be provided online as ordered. In addition to these, additional information, such as bibliographies (further readings), full-text retrieval of a certain selected readings, glossary and chronology of historical events, will be built in as part of the courseware selections.

    While a simple demonstration courseware is being developed with DEC's PRODUCER, most of the courses are being developed by using Videologic's DIRECTOR software. It is our hope that these developed courses will also be modified for popularly used microcomputers such as IBM XT and IBM AT.

CONCLUSION

    The First Emperor of China, with its humanities-oriented subject matter offering much visual grandeur, and its provision of both visual and audio information that is otherwise difficult to obtain, is a perfect research and development project for fully demonstrating the great potential of interactive videodisc technology for quick online access to multi-media and multi-formatted information, and for offering opportunities for a new mode of interactive learning and education.

REFERENCE

    1. Chen, Ching-chih, "Micro-Based Optical Videodisc Applications." Microcomputers for Information Management. 2 (4): 217-240, December 1985.

ADDITIONAL INFORMATION

    The following are a few selected publications on the project:

    Altman, Howard. "The Emperor and the videodisc." Newton Tribune. 62 (81): 6, June 25, 1985.

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    "Simmons project tracks treasures of Qin dynasty with new technology." American Libraries. 17 (3): 215, March 1986.

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    White, Laura, "China's Emperor I: A pocket history - Simmons dean to capture an era on videodisc." Boston Globe. pp. B14, B16, February 17, 1985.

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