

Acknowledgements

Thanks to the La Mesa Historical Society for providing historical images. Thanks to art teacher Shari Duran for her expertise and student input.

Disclaimer

This workbook is not a substitute for your software or hardware user manuals. Consult these documents or the manufacturer for specific product support. For updates to this workbook, check the VR Toolbox™ website at <http://www.vrtoolbox.com>.



Introduction

Prominent in current state and federal education reform initiatives, new technologies are gaining focus as instruments for revolutionizing learning. The International Society for Technology in Education (ISTE) has developed national educational technology standards (ISTE, 1998)¹ in cooperation with the U.S. Department of Education, major universities and large corporations. The standards recognize the role that multimedia plays in establishing technology-supported learning environments for the new millennium. These technologies appeal to multiple learning styles and offer students the ability to interact with instructional materials in a way previously unimagined. Today's multimedia applications allow learners to simulate otherwise costly or dangerous experiences, conduct experiments, visit remote locations, and model relationships, both real and abstract. These technologies also extend those experiences so that learning transcends school walls and the traditional instructional day.

At the forefront of immersive media is QuickTime™ Virtual Reality (QTVR) powered by Apple Computer, Inc.'s QuickTime multimedia architecture for MacOS™, Windows™, and UNIX. QTVR enables users to manipulate their views of environments and objects from any perspective. QTVR movies can be distributed on the Internet, embedded in web pages, or on disk as part of self-contained multimedia presentations. To “visit” a South American archaeological dig or “hold” a Peruvian artifact requires a mouse rather than a plane ticket. QTVR's affordability and ease of use makes it an ideal tool in the hands of both teachers and students for curriculum development and project enhancement. For those that aren't ready for the inclusion of electronic media in their lessons and projects, panorama software also enables one to create traditional panoramic images from a sequence of normal photo-

¹ For ordering information visit <http://www.iste.org>



graphs. QTVR assists in both unlocking creativity in teachers and making abstractions concrete for learners.

Purpose

The goal of this workbook is to help educators appropriately select and effectively integrate QTVR into their curricula in a way that enhances learning. It is designed to meet the needs of a broad spectrum of teaching styles. There is a danger that some may embrace new technologies because they are “cool”. Certainly the intrinsic appeal of multimedia can be leveraged to motivate learners but those that use technology as nothing more than a diversion or reward are missing its true power. It is our hope that the use of QTVR will unlock imaginations and contribute to the success of education in the 21st century.

Who should read this book?

Teachers who facilitate student learning in core academic areas through project-based learning and computer assisted instruction.

Media Technologists and Technology Coordinators who assist secondary teachers and students with the creation of curriculum, projects and portfolios.

Technology teachers who need of curricular materials and planning guidance for one, two, or three week immersive media modules.

Format

This book is divided to address three sets of needs: tutorials, guidance, and samples. Section one includes student and annotated teacher tutorials which guide learners through the essential steps to create QTVR movies. They may be adapted to fit within instructional units of varying length, both independent and directed. Section one provides



ground work for the remainder of the workbook.

Section two provides guidance and support for students and teachers engaged in project-based learning as well as traditional direct instruction. It is designed to assist learners in determining when QTVR is an appropriate choice for support of their objectives and coaches them in their various roles. Sample interdisciplinary projects provide teachers and students with concrete examples of immersive media supporting standards-based learning. We'll also examine a simple project model that doesn't require a camera!

We'll conclude with two projects that model simple QTVR enhanced lesson components within reach of innovative teachers, whether they are looking to revolutionize their teaching, extend their reach to distant audiences, or simply jump-start their presentations.

Software

For instructional purposes we'll focus on the unified suite of QTVR tools from VR Toolbox, Inc. Among worthy products available, The VR Worx™ meets *all* of these requirements:

- Easy for beginners to use while affording experts the control they require
- All components organized under a single, intuitive interface.
- Available in both Macintosh and Windows flavors. Project documents are portable across platforms
- Provides everything needed to complete lessons in this book - single and multi-node panoramas and object movies from raw image files
- Strong product support

Principles discussed here will also apply to several fine products available from other QuickTime developers.

Note: Users of any VR Toolbox individual title-VR PanoWorx, VR ObjectWorx, or VR SceneWorx will find instructions in this workbook equally applicable and their interfaces consistent with each VR Worx component.



Let's go to the movies, QTVR that is

When we say movie, we normally think of a linear motion picture or video sequence that features visual and audio elements. QTVR movies can be linear, but there is a bidirectional element inherent to every QTVR presentation- the viewer can pan left, right, up, or down. We can rotate an object clockwise or counterclockwise, and, if we so desire, on any axis. In addition to motion in the physical sense, we can use QTVR to step forward and backward through a period of time or a sequence of states. The possibilities are limitless. With Apple Computer's continued commitment to grow the QuickTime architecture and third party developers bringing to market ever-more sophisticated, yet easy to use tools, a growing number of educators and artists will choose QTVR as a means of communication and expression. In addition to adding directional sound to a QTVR panorama, look for features that will further extend the interaction of QTVR with other media and applications. QTVR movies are of two basic types: single node and object- add links between these and a scene is created.

QuickTime VR **single-node movies** are comprised of a dozen or more still images blended together to form a continuous panoramic scene. The exception to this is when a single panoramic drawing or painting becomes the source. The viewer may scroll through the panorama in any direction, zooming in and out to examine detail at any point. Ordinarily, the resulting image resembles a cylinder with the viewer's eye positioned at a point on its axis.

A panorama need not cover a full 360°. Any field of view can be rendered as a panoramic movie ,and,as all QTVR movies start out as a single blended image, they can be saved and printed as static flat images too.



Multinode scenes tie two or more panoramas together via linked hot-spots within each movie. These links make virtual tours possible across small bandwidths as well as in richly detailed presentations on CD.

Here's what you will need to construct panoramic projects in this workbook:

Tools

Camera

Virtually any camera will do, from a disposable single use point-and-shoot to a 35mm SLR, digital still, or video camera. The wider the field of view of the lens the fewer the number of photos needed. Lenses should be rectilinearly corrected, that is, there should be a minimum of distortion so that straight lines appear straight. Fish-eye lenses that bend straight lines are unacceptable. If the source is a single panoramic drawing or painting, a camera may not be necessary at all. A flatbed scanner may be the only optical equipment necessary. In that event, is important that art created for QTVR conform to dimensions acceptable for scanning and adhere to the principles of perspective inherent in panoramas

Tripod with panoramic head and leveling device.

The VR Worx software is sophisticated enough to correct errors in the alignment of hand-held photos. However, scenes with objects in the foreground point out the limitations of this method and accentuate the phenomenon called parallax, which makes it impossible to render a useful panoramic image.

Other specific tools and materials are described in the individual lessons where needed.



Software

The VR Worx software or the equivalent for acquiring images, blending, compressing and exporting panoramas. You will use both the panorama and scene features to map hot-spots connecting individual panoramas into a continuous nonlinear presentation. Check your software documentation for system requirements.

Object movies blend images of an object taken from multiple perspectives. This creates the illusion of the object rotating as viewed from a fixed point.

Tools

Turntable

Several finely machined turntables with motorized movements are marketed specifically for creating object movies. While these are preferred by professionals, a pantry turntable (sometimes called a Lazy-Susan) available in the kitchenware section of your local discount department store, will suffice. Instructions are included for the “do-it-yourselfer”. We will restrict our projects to simple single row movies that require a minimum amount of equipment. No panoramic head is needed for your camera, but a tripod, or other stable platform, is a must.

Other specific tools and materials are described in the individual lessons where needed.

Software

The VR Worx or equivalent object movie creation software. Check your documentation for system requirements.

