

INTERNATIONAL CONFERENCE ON MULTIMEDIA FOR HUMANITIES

Methodology of Multimedia Production

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The 100th Monkey Phenomenon

In a Beach in Japan the favourite diet of the monkeys was an apple like fruit. The fruit tasted bad since it fell down on the sand and got covered with sand particles. One day one of the monkeys discovered that by dipping the fruit in the sea, the sand particles got washed and the fruit tasted much better. Scientists observed that the monkey taught this technique to its family, who in turn taught it to other friends. This continued and every day a few more monkeys learnt the technique.

The rate of learning kept increasing, albeit at a slow pace, till one day when suddenly all the monkeys, not only on this beach but also on a distant island, learnt the trick. When the number of enlightened monkeys reached a **critical mass**, the *process of learning became a self-propagating chain reaction*. Social change in human order also works like the 100th monkey phenomenon.

At this critical juncture in history, when the world is suffering from scepticism in faith and there is a deep void in the minds of men, India must lead the way in guiding the planet out of chaos by sharing with the world its profound wisdom of the ages.

Like the peripatetic sages and seers of yesteryears, who were the harbingers of peace and harmony, technology today is the medium to take India's sagacious message to the world.

India canIndia must.

Introduction to Multimedia Production

After the invention of the printing press, it is the advent of multimedia that has changed the way we learn and comprehend. Integration of multiple media such as visual imagery, text, audio, video, graphics and animation together multiply the impact of the message.

Multimedia differs fundamentally from the conventional media like slides and films. While, conventional media are linear (one event follows another in a sequence), multimedia is non-linear - it has the capacity for branching in different directions and establishing linkages between different sections or components of the programme. The non-linear attribute provides the end-user the luxury of viewing the multimedia presentation at their convenience and pace.

Delivering multimedia content through internet

Websites on internet are making CD-ROMs redundant as a medium for delivering multimedia. This is because of the economies of reach that the internet offers, coupled with the facility of day to day updation and instant worldwide reach. The pace at which technological innovation is increasing bandwidth and making instant download of real audio and real video feasible, soon internet will take over CD-ROMs for delivering multimedia content.

In the field of Humanities, especially for a country with a rich heritage like India, effective use of multimedia can go a long way in preserving the ancient culture for posterity and disseminating information

to sensitise the audience.

This paper is meant as a guide for people who want to accept the challenge of being a part of the multimedia industry. It explores the steps involved in the production of a multimedia application.

This Paper is divided into four sub-sections:

Part A: Introduction to Multimedia production Management

Part B: Multimedia production Planning

Part C: Managing Production and post-production

Part D: Quality Assurance and Delivering Multimedia Application

PART - A

A-1 : Introduction to Multimedia Production Management

1968: an auditorium is full of sales managers watching a projected presentation at a large convention center. The presentation consists of filmstrips, synchronised tape recorders and overlapping slide projectors. The presentation is called multimedia.

1978: Two teenagers are engrossed pulling at an electronic game paddle, which in turn slams a tiny electronic ball across a video playing field, coupled with sounds of boops and beeps. Their game is advertised as multimedia.

1988: A pop music artist is performing a concert in which computers not only generate the music but also control the lighting and accompanying video. The bow of the artist's violin sends digital signals that trigger the computers. The performance is described as multimedia.

1998: A family returns home and the father in his home office plugs digital pictures into a business presentation, while the mother learns a second language from an interactive software programme and the children hook on to internet seeking help with their homework. Multimedia has become part of everyday life.

2008: Virtual reality on the internet, interactive televisions ..., its Nostradamus' guess.

The word multimedia is a very elastic term but broadly it refers to the **integration of multiple media** - such as visual imagery, text, video, audio, sound and animation - which together can **multiply the impact** of the message.

A-2: The Process of Production Management

The production of interactive multimedia applications is a complex one, involving multiple steps. This process can be divided into the following phases:

- Conceptualisation
- Development
- Preproduction
- Production

- Postproduction
- Documentation

A-2.1 : Conceptualisation

The process of making multimedia starts with an "idea" or better described as "the vision" - which is the conceptual starting point. The starting point is ironically the visualisation of the ending point - the multimedia experience that the targeted end-user will have. Conceptualisation involves identifying a relevant theme for the multimedia title. *We, at Magic, prefer choosing themes that are socially important and exciting to work on.* Other criteria like availability of content, how amenable is the content to multimedia treatment and issues like copyright are also to be considered.

A-2.2 : Development

Defining project goals and objectives

After a theme has been finalised for a multimedia project, specific goals, objectives and activities matrix must be laid down.

Goals: In multimedia production goals are general statements of anticipated project outcomes, usually more global in scope.

Objectives: Specific statements of anticipated project outcomes.

Activities: These are actions, things done in order to implement an objective. Specific people are responsible for their execution, a cost is related to their implementation and there is a time frame binding their development.

Defining the Target Audience

A very important element that needs to be defined at this stage is the potential target audience of the proposed title since, this will determine how the content needs to be presented.

A-2.3 : Reproduction

It is the process of intelligently mapping out a cohesive strategy for the entire multimedia project, including content, technical execution and marketing. Based on the goals and objectives, the three pillars of multimedia viz. Hardware, software and user participation are defined. At this stage the multimedia producer begins to assemble the resources and talent required for creating the multimedia application. The Production Manager undertakes the following activities.

- Development of the budget control system
- Hiring of all specialists involved in the multimedia application process
- Contracting video and audio production crews and recording studios
- Equipment rental, leasing and purchasing
- Software acquisition and installation
- Planning the research work of the content specialists
- Development of the multimedia application outline, logic flow, scripts and video and audio files production scripts and schedules
- Coordination of legal aspects of production

A-2.4 : Production

Once all the preproduction activities have been completed, the multimedia application enters the production phase. Activities in this phase include:

- Content Research
- Interface Design
- Graphics Development
- Selection of musical background and sound recording
- Development of computer animation
- Production of digital video
- Authoring

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A-2.5 : Postproduction

In this phase, the multimedia application enters the alpha and beta testing process. Once the application is tested and revised, it enters the packaging stage. It could be burned into a CD-ROM or published on

the internet as a website.

A-2.6 : Developing documentation

User documentation is a very important feature of high-end multimedia titles. This includes instructions for installing, system requirements, developing acknowledgments, copyrights, technical support and other information important for the user.

A-3 : The Multimedia Production Team

The production of fine-quality, high-end interactive multimedia applications such as - educational applications, interactive web sites, interactive information kiosks, interactive training - is the work of a team of specialists. Typically, the team consists of:

- Production Manager
- Content Specialist
- Script Writer
- Text Editor
- Multimedia Architect (or Programme Authoring Specialist)
- Computer Graphic Artist
- Audio Video Specialist
- Computer Programmer

The organisation structure of a multimedia development team is illustrated in Figure-1.

**Figure-1 : Organisation Structure of a
Multimedia Development Team**

Source: Multimedia - Production, Planning and Delivery
John Villamil and Louis Mollina, Macmillan Publishing

A-3.1 : Production Manager

The role of the production manager in a multimedia production is to define, coordinate and facilitate the production of the multimedia project. Capabilities of a good production manager include, knowledge of the basic principles of multimedia authoring, skillful proposal writing, good negotiating skills, conversant with relevant legal issues, good communication skills, budget management skills, experience in human resources management and overall business management.

A-3.2 : Content Specialist

The Content Specialist is the member of the production team who is responsible for performing all necessary research concerning the content of the proposed application. Programme content can be described as the specific information, data, graphics or facts to be presented through the multimedia

production.

A-3.3 : Script Writer

Video and film scripts present a linear sequence of events. In multimedia production, the medium has the capability of **presenting events in a non-linear fashion** by branching in different directions and establishing linkages between different sections or components of the programme. The scriptwriter of a multimedia production needs to visualise this almost **three-dimensional environment and integration of virtual reality** into the programme.

A-3.4 : Text Editor

The content of a multimedia production, like a book or a film, needs to **flow in a logical fashion** and the text must be **structurally and grammatically correct**. Text and narration will be integrated as part of the application and the development of documentation for the application must be considered. All of the text related elements need to be revised by the text editor.

A-3.5 : Multimedia Architect

The multimedia architect is the team member responsible for integrating all the multimedia building blocks (graphics, text, audio, music, video, photos and animation) by using an **authoring programme**. An authoring programme is a piece of software that allows integration of all the multimedia elements into a comprehensive presentation.

A-3.6 : Computer Graphic Artist

The computer graphic artist is responsible for the graphic elements of the programme - such as backgrounds, buttons, photo collages - and the manipulation and editing of pictures, 3-D objects, logos, animation, renderings and the like.

A-3.7 : Audio and Video Specialists

The audio and video specialists are needed when intensive use of narration and digitised video are integrated into a multimedia presentation. The audio specialist is responsible for recording and editing: narration; selecting, recording or editing sound effects; recording and editing music. (Music composition and performance is the responsibility of a musician). The video specialist is responsible for video capturing, editing and digitizing. The individual is responsible for taking pictures, scanning pictures or slides and editing.

A-3.8 : Computer Programmer

The task of the computer programmer in a multimedia development team is the programming of code lines or scripts in the authoring language. These code lines are used to code and develop special functions or capabilities of the authoring programme, such as generating random numbers for determining size and shape of video windows.

PART - B

Production Planning

"Goal Resources = Production Plan"

B-1 ; Defining the Production Schedule

A *Timeline*, defining the activities needed, the person responsible for each activity and the start/end time of each activity should be developed. This establishes the standard with which to compare progress, ascertain deviations from plan and take timely corrective action.

B-2 : Devising a Technical Plan

A technical plan addresses the needs of the production and the needs of the end user. It defines how an end user will experience the project and accordingly lays down the system requirement conditions like screen requirement, CD-ROM speed, memory requirement and hard disk requirement.

B-3 : Project Budgeting

Once the project timeline or schedule is ready, the next step is to prepare the project budget. This is essential as time and money are not infinite resources.

Some production costs can be estimated on the following basis:

- Scanning one picture or slide and performing minor Manipulations takes approximately 10 minutes.
- Developing one minute of computer animation takes approximately 10 hours
- One page of text takes approximately 15 minutes to type Into a word processing application.

If the project requires the development of video footage or audio recording, a detailed budget for these two activities needs to be developed separately, as the complexities involved in the development of these two components imply taking into consideration a number of specific costs.

Typical Budgeting Heads

- Cost of personnel (including part-timers)
- Advisors and Consultants
- Video Production
- Audio Production
- Equipment
- Equipment Rental
- Software
- Graphic and Audio Material
- Royalties
- Materials and Supplies
- Printing
- Communication Expenses
- Office Supplies
- Legal Expenses
- Travel

B-4 : Planning the Structure

It involves the following steps:

- Defining the goals and objectives of the proposed multimedia title

- Describing the content of the title
- Developing the application script
- Translating the application script into an outline
- Translating the outline into a logic flow chart
- Developing the storyboard for each screen

B-5 : Goals and Objectives Defined

The following critical questions need to be addressed, while formulating the goals and objectives of the multimedia application.

- What is the purpose of the proposed title?
- What is the team trying to accomplish?
- What are the expected results?

B-6 : Programme Content

Programme Content can be defined as the specific message, data, facts or information to be presented. The content specialist provides the programme content to the multimedia architect, who in turn prepares the narration, text, bullets, charts and tables that will be presented in the title.

The potential multimedia application users have different expectations, information needs, attention spans and learning styles. The application to have the necessary impact on its varied target audience needs to effectively and logically integrate the multimedia building blocks. The integration of a variety of multimedia elements appeals to different learning styles and helps the audience comprehend and retain the information.

Multimedia building blocks include:

- Text
- Video
- Sound
- Graphics
 - Backgrounds
 - Photographs
 - Three-dimensional graphics
 - Charts (graphics)
 - Flowcharts

B-7 : The Multimedia Application Script

The Application Script is a written description of the proposed multimedia project. The purpose of the script is to describe the actions of all components. The script helps the development team have a clear understanding of the purpose of the programme.

B-8 : Outlining

Multimedia differs fundamentally from the conventional media like films and slide shows as conventional media are linear (one event follows another in a sequence), while multimedia is a non-linear medium - it has the capacity for branching. The simplest way to define branching is to develop an outline. The major headings in the outline become the options available to the user in the main menu of the programme. When a user selects a heading, the subheadings associated with the selected major heading are

displayed.

B-9 : Logic Flowchart

The logic flow chart is very important, especially if the title is interactive. It provides a road map of the proposed application for the authoring team. The flow chart illustrates the choices that the user will have in each screen. The degree of complexity of these flow charts depends on the type of application to be developed.

B-10 : Programme Storyboard

The storyboard is a graphic representation of the proposed multimedia project. It is an extension of ideas presented in the script.

B-11 : Production Script for Text, Audio and Video

The next step in the production of the interactive multimedia application is the development of specific and detailed scripts (descriptions) for text, audio (narration, music or sound effects) and video.

B-12 : Hardware Issues

For any multimedia production it is imperative to consider and finalise the "tools" and equipment necessary to develop and play back the application. Hardware issues include deciding, securing the fastest CPU and RAM and largest monitors that is affordable, sufficient disk storage for all working files and records, file sharing for collaborative work via networks or e-mail and establishing a file back-up system.

B-13 : Authoring Software Selection

Selection of appropriate authoring software depends on what is the in-house team expertise, what are the funds required to acquire new software and to train the manpower and what are the demands of the new title being developed. For e.g. for a business or training related application it would be better to use an authoring programme that has built-in spread sheet and chart capabilities. Two most widely used authoring applications today are Macromedia. Director and Macromedia Authorware.

PART - C

Managing Production and Post Production

This involves managing the production process and planning and managing content acquisition.

C-1 : Managing the Production Process

The prime role the production manager is to keep the project **on-time** and **on-budget**. For this detailed **Timeline/PERT charts** need to be developed and an effective **tracking system** needs to be designed and implemented to keep constant track of what is going on. A good tracking system should monitor and keep record of the following project development aspects :

- Project Financial Accounting System
- Project Building Blocks filing and record system
- Artwork and applications screens and interfaces
- Programming code filing and documentation system

- Project revision and testing records

C-2 : Managing Content Acquisition

C-2.1 : What is Content

Content is the "stuff" around which an application is developed. It is the text, narration, graphics, colors, backgrounds, videos and animation. In other words, content are all the elements that compose a multimedia application.

Content has a **value** and a **cost**. Cost refers to the monetary price incurred to acquire or develop content, while value refers to its merit, usefulness, importance, or significance. A balance has to be struck between the value and cost of the content against the production budget and the desired outcomes.

Content acquisition is one of the most time-consuming and budget intensive activities during the development of a multimedia application. The multimedia producer has to determine if it is feasible to incorporate the suggested content based on its cost and value; determine the alternatives; evaluate the legal implications of using proposed content; and, determine the best strategy to develop or modify the desired content.

C-2.2 : Content Identification, Selection, Development and

Acquisition

Content either has to be sourced or if it is not available then it has to be created. This implies that the source must be identified, selected and the content acquired, or it must be developed. Mostly, budgetary constraints define whether content is developed, purchased or borrowed. **Copyright** issues are the next most important constraint that influence content generation.

The main responsibility of content development lies with the Content Specialist, Script Writer or Computer Graphic Artist. The content specialist undertakes the following tasks:

- Content research
- Identifying document sources
- Identification of the building blocks like colours and graphics representative of the theme, time or period to be presented in the application
- Identifying individuals to be interviewed
- Location to be videotaped

The responsibilities of the Script Writer are the following:

- Content evaluation
- Adaptation of the content to the goals and objectives of the application
- Development of the application script and storyboard based on the content
- The computer graphic artist is responsible for the development of the following:
- Developing line art necessary for the application
- Scanning and editing of photos, backgrounds, and other Graphic elements
- Chart development
- Maps preparation

- Text manipulation
- 3-D graphics and walkthrough
- Computer animation

If content is not readily available then it needs to be developed. The creation of story, graphics, or the composition of music are examples of content development. Sometimes content needs to be adapted to meet the needs of the application. This includes editing and manipulation of existing graphics, photos, video, sound or text.

C-2.3 : Copyrights

Producers and users of multimedia programmes need to be aware of and abide by the copyright law. Multimedia productions, by definition, combine a variety of elements from varied sources. It is essential to know how the use of these materials is affected by legal constraints. It is also important to acquire copyrights for own production, after its completion.

PART-D

Testing and Delivering Multimedia Application

D-1 : The Evaluation Process

Testing of a multimedia title is essential so that the final application adheres to international quality standards and is not infested with bugs, technical snags, inaccurate information or simple grammatical or typographical errors.

The process of evaluating (testing) and revising a multimedia application project is dynamic and constant. It involves both internal and external evaluation.

D-2 : Internal Evaluation

The happens within the multimedia development group, through internal discussions for evaluating the aspects of the application:

- Application design : is it logical and facilitates learning
- Project goals and objectives : are the established goals and Objectives being met
- Content is the acquired content represented accurately
- Text and narration : are the text and narration grammatically Correct
- Application graphics : are the application graphics adequate To fulfill the goals and objectives
- Sound : is the background music, effects and other sounds well recorded
- Application navigation : are the navigational structures and Aids effective
- Programming code : is it working as originally planned
- Delivery : can the application be delivered via the proposed medium
- Time and budget : is the project on-time and on-budget
- Legal considerations: have all licenses and other copyrights Been procured

The prime responsibility of this function lies with the production manager and can be most effective if the team members are open to positive criticism of their peers.

D-3 : External Evaluation

The following are the components of external evaluation:

- Alpha Testing
- Focus Group Testing
- Beta Testing

D-3.1 : Alpha Testing

Alpha testing takes place when the project is considered a working model i.e. it is not finished but it is functional. The purpose of Alpha testing is to determine if the general direction and structure are adequate and what changes are necessary. Members of the Alpha-testing group should include a balance of friends and critiques.

D-3.2 : Focus Group Testing

After revising the application based on the feedback of the Alpha test, another possible strategy is to present the application to a focus group. These groups are composed of individuals who represent the expected audience of the project. Standardized forms should be used for requesting comments and suggestions from the Focus Group.

D-3.3 : Beta Testing

Once the project is in a final draft form, copies should be made available to a group of potential users called a beta-testing group. Here again, standardised questionnaires should be used for collating feedback.

Quality Assurance (QA) is the formal name given to the process of beta testing. When the beta version of a multimedia application is released and the functionality testing starts, the QA process has formally begun. Beta testers check all possible paths of navigation and log all events that strike them as unusual. In addition they do things that users will not usually do like multiple mouse clicking, dragging things around and entering unneeded keystrokes. The idea is to look for things that do not work. Beta testing can be done in-house or it can be outsourced to a professional lab, depending on financial resources and product secrecy issues. Beta testing includes:

- Compatibility Testing
- Functionality Testing
- Functional Localisation Testing
- Install Testing
- Performance Testing
- Stress Load Testing
- Load Testing

D-4 : Project Revision

After the tests are over the production manager and the multimedia architect should discuss the merits of each of the comments and suggestions offered by the evaluating group. Based on the feedback the application should be revised, incorporating the valid changes suggested. The application revision sequence is presented in the Figure-2 below:

Figure-2 : Multimedia Application Revision

D-5 : Developing Documentation

User documentation is a very important feature of high-end multimedia titles. While designing the application documentation, the following information should be provided :

- Instructions for installing the application
- Information about what files to install in the computer
- Operating system
- Notice about system requirements
- Warnings about potential extension conflicts
- Content Development Acknowledgment
- Copyright Acknowledgment
- Notes for trainer, if it is a CBT application
- Directions for navigating into the application
- An e-mail address for sending comments and suggestions
- Contact details for technical support

This information can be provided to the user in the form of a Read-Me file, which is a self-contained read-only document contained in the application itself. The other way is to develop a printed User's Manual for the information to the user.

D-6 : Delivering the Multimedia Application

High-end multimedia applications that are text and graphic heavy are best delivered on a CD-ROM. The other effective way of delivery is on an internet website.

D-7 : Burning a CD-ROM

Before recording a CD-ROM, it must be ensured that the application and supporting Files after they are recorded on the CD-ROM. Read and Write CD-ROM drives will allow editing in the near future. The process of burning a CD-ROM is similar to recording on any type of drive hard disc or floppy diskette.

The issue of which CD-ROM format should be used has to be considered before burning a CD-ROM. Formats to choose from include-ISO 9660 Standard, Hierarchical File System (HFS) Hybrid, Global Hybrid Mixed Mode. Of these the standard format standard format sanctioned by the International Standards Organisation is ISO 9660. This standard has several file structure variations to accommodate the needs of different operating systems and file types.

D-6.2 : Delivery through internet website

Multimedia content is being widely disseminated through internet. Although currently bandwidth problems, requirement of a number of plug-ins to play real audio and real video, long download time and other problems exists that hamper the delivery of multimedia applications through internet, the pace of technological improvement will soon pave the way for easy and effective delivery.

One major advantage that internet will have over CD-ROMs is that are amenable to continuous updation and hence the content does not get outdated.

D-6.3: Integration of CD-ROM and Internet

The relationship between CD- ROM and internet is similar to the relationship between computer's hard drive and ROM. On the ROM, the information once recorded cannot be changed, while on the hard disc information can be written over and over again.

A more effective way of delivering a multimedia application is an integration of the two mediums of CD-ROM and Internet. A particular application if developed on the CD-ROM, has an embedded link to a website where regular updates are available. Vice-versa, if the application is developed as a website where information keeps accumulating, then as the archive becomes substantial it can be reproduced on a CD-ROM for convenience viewing.

Concluding Remarks

Building the Technology Bridge

Interactive multimedia technology is the ideal medium for an exciting voyage of rediscovering our roots. An understanding of our country's ancient and rich heritage provides a perspective for the present. This leads to an appreciation of the "*whole*" and helps build bridges of understanding with the past and a conduit for improving the future.

A word about Magic Software. Established in 1990, Magic is today a young team of fifty professionals from a wide spectrum of disciplines like – visual communications designers, animation designers, editors, social science specialists, engineering and software professionals and even musicians. Deeply fascinated by Indian philosophy, over the years we have pioneered blending India oriented content and state-of-the-art technology, to create CD-ROMS titles like *indiaMystica*, *indiaMusica*, *indiaFestiva* and *Mahabharata*. We are now launching a series of websites around the mystique of India. Our website hindiguru.com is a high-end interactive website for teaching Hindi on-line. Excitement of innovation is our driving force.

Visionaries at *Indira Gandhi National Center for the Arts (IGNCA)*, deserve all praise for organising the timely conference on "Multimedia in Humanities". On behalf of the young team at Magic Software, I would like to express our sincere gratitude to Dr. Kapila Vatsyayan and Mrs. Neena Ranjan, for giving us this chance to make this presentation.

IGNCA has undertaken a colossal task in digitally preserving the culture and heritage of India. It would be our privilege to be associated in their endeavour to creatively use electronic technology for generating awareness about the wisdom of our ancient heritage and preserving it for posterity.