INTERNATIONAL CONFERENCE ON MULTIMEDIA FOR HUMANITIES

Managing Electronic Interactive Multimedia Publishing: A case Study

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Encyclopedia India is the largest electronic interactive multimedia database on Indian tourism. It covers over 600 cities and almost 4000 sites within these cities. Historical monuments, religious places, parks and lakes, adventure sports, markets and bazaars, wildlife parks, beaches, hill stations, modern institutions, cultural centers and virtually any tourist attraction throughout India is presented through text, images, sounds, videos and an aesthetically pleasing and Indian context. India's history and demographic facts, culture, music, cuisine, festivals are all part of this almost 4 giga-bytes(4000 million bytes) database spread. The two and half years spent in developing this product have been an eye-opener for the author in the context of electronic multimedia publishing. A variety of problems, blind alleys, mistakes, fumbles, wrong starts and all sorts of the "unexpected" have raised their head at various stages. The challenge to take them head-on and to dourly grapple with these situations has taught the author great tenacity and made one wiser to the process of multi-media interactive database do This paper is a case study of the experiences involved in developing such a large project. It aims to inform the reader the methodology followed in the development; shares with the reader the mistakes made; the process of "learning" and recovering from the mistakes; and the exhilarating experiences of minor and major successes. It also provides tips on how readers may plan their own projects and through personal experiences and specific examples, this paper demonstrates that conclusively that even the most intuitive projects require careful planning and large projects require large planning. Although no amount of planning can ensure a smooth ride, careful planning and control can ensure the viability of your project. Haphazard and ill-focussed planning may lead to either abandoning the The process of interactive, hypermedia development is also a great educator.

It provides a unique learning experience to the inquisitive mind. This is both a boon and a bane. The requirements for product development are completely different from the aspirations of technical excitement. Large projects require stable and prolonged efforts which in some senses "leaves the product team behind the cutting edge of the technical wave" although they may have started the project at the leading edge of technology. This presents great demands on the information te At the same time, the challenge to integrate with design artists, historians, social scientists, archaeologists and other personnel from non computer-intensive fields for a generation accustomed to interacting with and manipulating "machines" can be both daunting and immensely satisfying depending on personality types An insider view into the learning curve of this process it is hoped will make in In 1994, the author had his first experience at experiencing the spread of multimedia interactive publishing technology while on a visit to USA to examine the future trends in multi-media archival of cultural artifacts. It was clear that here was a new paradigm for information interchange and one that would quickly grow to eat into the mind-share of traditional publishing industry. Stacks and shelves of interactive CD-ROM titles on a variety of subjects and strong interest in the local populace for consuming the same convinced one that it was profitable. It was also clear that here was a medium that could capture the intricacies and the "deep" inter-connections found in ancient cultures to accurately present then to people unaware of the same. Hyper-media was a tool that had the power to encapsulate large bodies of information; make available a low cost duplication and duplication medium: provide the means to update the content with substantially Armed with the enthusiasm of the entrepreneur, the author returned with my mind set to create the "largest compilation of multi-media databases on Indian tourism". It seemed a perfect candidate for a large effort. India's vastness and deep history provides it within numerable historic monuments and a rich cultural heritage for tourists to discover; its geographical spreads are enormous opportunities for leisure tourism; its mystique is a magnet for almost all of the world. Yet its lack of consolidated documentation on tourism related

subjects is often cited as a limiting factor in its ability to attract tourists. We would research, compile and package all the information into a single-window inter-active data bank that could "replace" the need to look at all tourist guides and travel books Once we had found a sponsor equally convinced about the viability of the project, it was vital to establish the design and the scope of the project. We all under Having identified "Tourism" as our subject area, we procured all major existing tourism CD publications to research their models, contents, linkages and effort of production. Based on this research, a preliminary, conceptural level outline of the project was prepared. The team involved in this activity comprised of only At this stage, our sponsor decided to checkout our preliminary design with a leading "tour operator" so as to have an industry opinion at an early stage. It seemed like a good idea and we enthusiastically accepted the comments and suggestion.

The engineers had visualized the product as an "end-user" commodity. An encyclopedia that would be purchased by households for their reference and for browsing the content at their leisure time. The tour operator saw the product as a supplement to tour operator/travel agent services and introduced many elements, which were beyond the scope of the initial design. Obviously, none of the CDs we had The tour operator's team was inducted into the development team. Unfortunately, this gap in product perception was not explicitly discussed at the initial stage and only towards the end of the product development did it emerge that the deve When the development was done (save for some media content which was yet to be digitized and which could have been plugged in as it became available), the travel experts refused to accept the project as "closed". It did not meet their objective of "planning a detailed itinerary for a traveller from point to point with full information on the city, the site-seeing, the cuisine, the culture and the transportation schedules". In short, they had wanted an itinerary planner system, which could print a customized/personalized itinerary for a customer! The development team was thinking of "an easy to use, comprehensive source of reference With this gap, the product marketing ground to a halt. While the initial desire was to sell through distributors to home consumers (a time consuming and high cost activity), the "trade experts" convinced the sponsor that a "tour operator oriented" product could be sold to the entire trade at substantially lower cost and effort. However, it was too late to try to bridge the gap without undoing many of the software components. The product continues to be canned in-spite of bein Lesson 1: Define the target user profile of your effort clearly and communicate the same to all the development and the advisory team.

Software products are too Our initial research and preliminary look at some of the popular printed material on Indian tourism indicated that we were taking on a significantly large assignment. All of us were keen to therefore define the scope of the project so that we could a) develop the product within a time frame wherein it could exploit the market opportunity and b) within the initially agreed cost and budget structure The tourism advisors on the team recommended a list of 75 to 100 cities and about 1000 sites within these cities as the prime destinations for tourists to India. This was agreed to be a good scope of work and also one that covered over 95%. Having defined the scope of the product, the development team put together a development plan, a detailed software design document, a programming team, content management and content creation team and set about its task in great earnest and However, two critical events three months down the line changed the essence and the scope of work. The first was the announcement by another firm that it had released a CD-ROM on Indian tourism, which covered the same 100 cities. The sponsor panicked at the thought of competition and without any evaluation of the quality and content of the announcement and without considering the threat the product had, if any to this project, enhanced the scope of the project to cover all of India! "We will do a product that no one has done, will do or needs to do" was the slogan. It was a great slogan and a giant ambition. The gigantic scaling of the content from a single CD-ROM to a six volume CD-ROM set completely made redundant all the initial planning and scheduling and forced the development team to The second related to the announcement of the DVD (Digital Video Disk) format, which promised upto 10 times the capacity of the existing CD-ROM on a single disk. The technical team got excited about the possibility of having the only "real application which could use all the storage of the DVD" and agreed to the demand This change resulted in major delays on the project, which led to rapid fall in the staff enthusiasm levels, a disintegration of the development team and left a The resultant delays also meant that the project crossed the time limit in which the underlying computer and software technology convolutes into a newer, updated and usually a non-compatible version! This forced the project into a newer, updated and usually a non-

compatible version! This forced the project into an even longer time horizon, which finished off the resistance of even the last of the original developers. As a result, the product today has no regular maintenance and 1 Lesson 2: Do not tamper with the scope of the project mid-way through. Do not change the scope of the work by more than 10% at the maximum. It is better to release a smaller version and then have a upgrade/update path or a supplemental prod Tip1: All projects experience a high level of enthusiasm and commitment at their start. Projects which can not close while these levels are higher than average can be a lost cause. Any project that goes beyond a two-year period must plan. The heart of a good multi-media presentation is god content.

The content may be in the form of text, graphics, pictures, animations, sounds, video and even nicely designed links and navigation strategy. Over 80% of the total product that you will create is comprised of these. Obviously therefore, over 80% of he time, effort and costs of the project will go into content compilation, structuring, generation and storage. It is amazing that many project teams make mistakes in sizing the content compilation effort and cost and end up with a product far shor Our initial study had revealed that we needed a large content database (for 100 cities as originally planned). We had looked at the sources from where we could compile the content and the task looked possible although complex. With the new The reason we wanted to do an electronic encyclopedia on Indian tourism was that information on all of India was not readily available with any agency. By opting to do an exhaustive compilation for our project" to "compile a multi-media reference project"! We now needed over 20,000 images from all of India, over 200 audio clips of folk songs from each region, video clips of festivals, ceremonies, dances, pictures of cuisine, musical instruments, musicians, historical perspectives of dynasties, pictures of princes and rulers… The essence of our preliminary design was to use lots of media to offer great interactivity and an entirely holistic browsing experience. Our own playing field changed into a marshland and from a software development leader, the author necessarily became a "media and resou The problems of media compilation was further complicated by the fact that we were neither a media repository ourselves, neither was the sponsor, nor our travel advisors. Our plans were to source the media requirements from outside agencies.

At the new scale of media requirements no agencies could do our job and the co Added to this complexity was the complete lack of awareness of "co-operative and collaborative" work environment in the country. We faced o9fficials from the ministry and department of culture who simply could not comprehend that a less than 1 minute video clip of a festival from their video collection could be shared with our effort and would benefit everybody around. They had no idea of what we could pay, whether they could sell, what the policy was and they stalled and stalled. The private media resources were no better. Convinced that we were a "cashrich" group (who else would attempt this madness) they quoted astronomical sums to "allow" use of 20 seconds of music or photographs from their collections. And we had no choice but to generate the media ourselves! We roped in a team of travel writers and photographers, graphic illustrators and editors and assigned them the huge task of creating the media for the product. This required major coordination and monitoring to ensure quality and consistency in the work. Managing the media as it came in, creating databases which reflected the raw work, the work in progress and the finished work and setting up an inventory system for media management was not trivial. Try managing over 4 Giga-bytes of data and over 200,000 files and you will see. Mid-way through this effort the author realized why no sensible person had attempted to compile the information we were seeking to Lesson 3: If possible, select a domain where you already hold the media. Converting traditional media to digital format itself is a big task. Taking on the addit Lesson 4: For a small project, having lots of media inter-relate to each other is a good idea. For a very large project, use media only as an information and not as a link. Managing a hyperlinked database of large proportions is an immensely complicated exercise and few automated tools are available. Try converting any In 1994, when the project started, packaged software tools to author a multi-media presentation were not very powerful. Most multi-media projects resembled a media database rather than a heavily interactive space of the subject through which the user could select his/her own views. Our development team decided to create our own authoring engine which could give us the power and flexibility to sharp On hindsight, we could have avoided this route and saved on the software development effort to a large extent. Had we envisioned and forecasted the growth of authoring tools and the World-Wide Web (WWW) for instance, we could have concentrated on the task of defining the layouts, the templates and the linkages between the media and information elements rather

than work on the software that put thi However, we were a group of software developers and we were good at our job. We could tweak a computer into doing the things we wanted it to do. This attitude saw us develop an authoring engine capable of providing multiple titles if required and also fed our software appetities. At the same time, owing to our growing confidence and success in developing component after component of our design, webecame a touch arrogant about our development abilities. Coupled with increasing demands from the tourism advisors for components that would be fit for an itinerary planner (e.g. an automated optimized router for all 600 cities based on the travelling salesman problem, an application which would take a mainframe some doing)., this meant that we let down our guard of judgement and gave into the Another problem which resulted from the decision to write our own authoring engine was that we put our media management outside the scope of the existing authoring and browsing domains. By designing for our internal data representation formats, we made it very hard for us to revert back to an available off the shelf solution that could evolve as we went along. Of course, had we known we were going to spend over 2 and half years developing the product, we would have decided all Lesson 5: On an interactive presentation, the media and the navigation are the main heroes. The software must play a sub-ordinate role.

The size of the media and the inter-linkages will change in the future so that care should be taken to create a system that can easily change if external factors (such as new technology The multi-media technology has often been called an "integrating technology". It is able to integrate the power of multiple medium using the digital representation schematics of computer systems. However, the process of converting traditional (non digital) media into digital form is not a trivial task and the road to Human collections of still images go as far back as the origin of photography (for photographs) and even further in the case of paintings etc. Obviously there are issues of age, color, handling complexity, value propositions that are linked to such collections. The varied possibilities of the digital world are no less in complexity. Image file formats which have size, color and speed of processing issues; image size has direct bearing on display quality, zooms, storage space; image acquisition has the issue of selecting scanners and their properties; and For a large collection, image scanning will be a large effort. A high-resolution scanner will often save time in image editing and finishing (and re-scans) although it may be costlier. It is also advisable to plan all the file formats that the project will require and all the sizes (and resolutions) that the storage is planned for and process an individual image only "once" There is never time to Storage of a large collection of images itself is an interesting challenge. The aim should be to create a framework so that the digital image and the physical image can be fetched in short time (should the case arise to edit/re-scan an image). Using a database to track the image inventory and setting up schedules for At the beginning of our project, we experimented with a low resolution scanner and scanner over 500 images having convinced ourselves that we could edit the images and touch them up later. One look at the results of a high end scanner brought this notion crashing down! It takes more than 10 times the effort to "finish" an image than scan it with a good (though costly) scanner and in many cases the Tip: Finalize the file formats and the sizes and resolutions that may be required for your projects, use the best equipment that your budgets permit (keeping in mind that the cost of image editing may be more than the cost of scanner) and scan the image collection in one pass. Use a good database system to track the co Audio formats in the digital media are fewer than image formats. However, the quality and length of audio are the main issues here.

The quality of audio increases with the bit-depth, so that 32 bit stereo is the best and 8-bit mono is at the bottom of the scale. The choice of formats should be dictated by the software drivers the users are most likely to have on their hardware. For kiosk type appl Most CD audio is typically 8-bit stereo! Good sound quality at the minimum storage requirement is the issue. Some pieces, especially music can be 16-bit stereo. However, it is best to use restraint and remember that most users will have only With the advent of fast processors video has become an integral part of the multi-media developers repertoire. It is often tempting to go for long video shots at full-screen or similar sizes to deliver the power of video. However, this comes for a price. Ur own experience is that the video collection can be partitioned into the a) impact stuff, b) the regular stuff and c) the once in a while stuff. Obviously, you want the impact stuff to be good size and of sufficient duration. The others can also be stamp-size with a lower frame rate and colors. Anything All of this will change if your topic happens to be the history of feature films in India! The main content in this case would be the videos! So let the content Tip: With audio and video, it is best to let the

experts handle the editing. With low-cost cards and some editing software, it is possible to edit this stuff yourself. However, the initial enthusiasm of apparent success soon becomes a major constraint. To achieve focussed messages, the editing is best left to the experts. In our experience the video/audio worked best when a set of professionals were assigned the task of editing the raw material to our specifications and we co Text entry should be the easiest of the media conversion tasks, right? Think again! Most interactive presentations come with interactive text. Links are embedded within the text so that the reader can explore the related topics or informati Research shows that most people hate scrolling. So how do you plan text that stays on a single screen. If as a developer, you are planning to use scrolling, what about multiple resolutions on the display. How well does your text presentation engine automatically adjust to the changes in the screen size. These are the m Using an inventory/portfolio system to manage large chunks of text is also highly desirable.

At the end of our project, we had over 8,000 text files on cities, sites, festivals, cuisine and had we not developed a database system to track these, the sheer effort of manipulating the files would have been dauntingly impossible. We had luckily anticipated this and we could through our database revamp Creating new text on your topic is a different entity altogether. You must employ a set of writers who will deliver the content to you. Beware of using journalists who are not well versed with the interactive medium. Writing for a newspaper and magazine is open and has the flexibility of printed media. Writing for the computer based system demands a copy-writing style and an attention grabbing; here are the facts approach. The user can hit a link button and move at great pace Tip: Beware of accepting work on paper. The effort of data entry and formatting can become huge,. Wherever possible, ask for and work with "soft" copies (word prMulti-media interactive products have a great presentation impact. They use highly creative graphics to illustrate the products. Backgrounds, buttons, shades, shadows and a variety of graphic design elements combine to create the right cont The holistic design of the look-n-feel is however a professional subject. It takes the skills of a graphic layout artist to design a set of templates and frames that will impart a unique and consistent interface to the entire content. Moods, colors, choices of iconology, cultural dependance all come into play. This is At the same time, many graphic designers do not have sufficient exposure to the limitations of the digital medium. The choice of colors, the sizes of icons, the size of text elements can best be explained by the engineers.

It is a great learning process for both the technologist as well as the artist. And it is expecte The process of integration of all the media, the navigation and the user-interface can take a long time if not planned well in advance. The rapid prototyping theory finds good fit in this domain. It allows the developer to put together a small but complete presentation which expands as more and more media comes into pr The Advantages of having an early look at the final product are immense. It allows for review and feedback from target users and also serves as a testing ground for new media and new components. Development teams will do well to follow this Multi-media interactive products can fail on many grounds. The most embarrassing are media failures, i.e. out of context media. Detailed testing can ensure that all media links are appropriate. Automated test procedures should also be used. Testing for media completeness and that all the data on a product is complete, accurate, virus free and corruption free is essential before you cut your CD-ROM It is hoped that the above observations based on the author’s experience of having developed a large multi-media system will help readers venture into their projects with caution and with the knowledge of pitfalls to avoid. Multi-media development can be great fun to work with. It can also turn into aborted attempts at great cost of money and time if not carefully planned and executed.