

INTERNATIONAL CONFERENCE ON MULTIMEDIA FOR HUMANITIES

October 5 - 8, 1998

ABSTRACTS - MULTIMEDIA & COGNITION

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The beginning of Brhad by R. Nagaswamy

To reach beyond time and space has been man's aspiration from the beginning of human history. He wanted to communicate and preserve his thoughts, words and deeds not only to those who were immediately present within his reach but also far beyond and also separated by centuries. The first revolution in this direction was the discovery of writing through which he could record his thought and with this begins the historic age. In the Indian context the Vedic sages invented the sophisticated technique of communication and personalities were trained to commit to memory the thought of by gone ages through a unique system developed to adhere to the original words, their order, their intonations etc., by the vedic pada pathas ghana, jata patahas. This system no doubt has preserved the thoughts and poetry of those ages for the four thousand or more years. Judging from its survival for such long years, it has been a great achievement, has served the civilization admirably and will continue to fascinate a select few. In spite of perfect mastery, various schools arose in different parts of India giving rise to several recensions and also an urge to question to what degree the attempts to explain the originality of content through commentaries are correct. This was mainly due to imperfection of the human media. the volume of conflicting commentaries make it evident that there was concern over loss of knowledge and also the grasp of ancient thoughts.

The introduction of writing around 3rd cent B.C. shifted the process of transmission and preservation from human to mechanical media. Writing enabled now the thoughts to be preserved as originally conceived. It was necessarily confined to the written lines but enabled several persons to know from a single source. The introduction of writing was not accepted by the orthodox who insisted that the traditional system of oral transmission was superior and sacred and looked down upon the writing system. medieval commentaries in Tamil say that writing was invented for those who can not mentally visualize and retain forms. the Vedas transmitted through oral tradition are called "Literature not committed to writing". However the increasing complexities of life and administration of the state properties and settlement of disputes soon led to pre-eminence of written sources than oral tradition. The dharma sastra (law treatises) and the administrative treatises like artha-sastra gave first pre-reference to written deed than to verbal testimony. The lekhyam-pramana was the foremost instrument of evidence of conveying original concepts.

The evolution of script and the vast body of material, written on perishable materials posed the problem of imperfect grasp or loss of knowledge through the centuries. Also, all thoughts and sound could not be reduced to writing which had its limitations. The discovery of photography,

initially black and white, later colour, helped in recording still images but with the discovery of movies, made it possible to record moving images. Supplemented by the discovery of audio recording, it was possible to record the movements, thoughts and colours. The discovery of videos made the recordings within the reach of the all and shifted the expertise from highly specialised studies to the common man.

The computer revolution now taking place make the mind to perceive multi dimensions of all human thoughts, achievements and endeavour through a single instrument at tremendous speed, efficiency and authenticity; enables larger and ever increasing number of personalities to avail this opportunities to learn, utilise and plan for future endeavour. In fact it disciplines the thinking process of human mind and gives scope for greater appreciation of arts, thoughts and science. The paper will discuss how this is helpful in appreciating art and architecture.

Multimedia : a learning experience with special reference to Indology by P. S. Filliozat

The present paper aims at analysing the experience of an Indologist who participated as content-expert in the production of a CD-ROM on a temple of Karnataka. It has been a learning experience for him, in the sense that it has been an occasion for reflection on his methods of work with a view to adapt them to the use of the new and powerful tool which the computer promises to be.

Any researcher in the field of humanities disciplines is trained in preparing a book. Preparing a CD-ROM is obviously a different exercise. The contrast between both activities is analysed in the following fields:

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|-----|--|-----|--------------|-----|-----------------------------|
| 1.1 | Writing | vs. | digitisation | of | text |
| 1.2 | Drawing | vs. | digitisation | of | graphic data |
| 1.3 | Photography | and | video | vs. | digitisation of visual data |
| 1.4 | Recording | vs. | digitisation | of | sound data |
| 2. | Indexing | and | card-making | vs. | database management |
| 3. | Comparative research vs. automatic linking | | | | |

The book has a few handicaps which can be compensated by the computer. The most promising facilities offered by the new tool are the high variety of multimedia modes of display of data and interactivity devices. On one side the author has more facilities to deliver his message. On the other the user has more scope of personal activity.

The expectations of researchers from Multimedia are therefore high. They arise in the course of research and at the time of presentation. Research in most humanities disciplines means exploring data of diverse types, texts, script, archaeological visual material in the form of designs or photographs, sound documents spoken or musical etc. The aim is to correlate data and discover common structures or distinctive features. The researcher sees multimedia tools as a powerful tool to explore a large quantity of data, to consult and search items, to compare and sort out.

Difficulties are met with, as soon as the preparation of a CD-ROM is undertaken. Solutions offered appear as constraints imposed on him. In general the researcher starts the work with the concept of a traditional book in his mind. To enter into the world of multimedia, he has to make himself aware of requirements of a CD-ROM such as:

adaptation of the contents to the design of windows,

break down of the contents in screen-wise presentation, vs. the continuous flow of the book,

requirement of images, for each screen, vs. the book frequent disposition of a mass of text followed by plates grouped together separately,

requirement of sound in connexion with a screen, in a convenient time-limit,

multiplicity of links to be predetermined, etc.

The new tool will definitely lead researchers and users towards new directions. Profitable or detrimental. Right from now, we may examine it. It seems that the incitation to interactivity is the greatest benefit to be derived from the CD-ROM. But the breaking down of knowledge in small units to which database management and screen-wise presentation are leading to, may be a drawback, as being detrimental to the continuity and strength of thinking.

Computer aided cognition by Sanjay Goel

Communication technology has been history's driving force. To support human communication, the electronics industry has made significant progress in Telecommunication, Consumer & Entertainment Electronics and Computers. The Publishing industry has undergone a revolution in the last twenty years because of the integration of the Printing Press with Computers. Until recently computers did not support high capacity, portable content storage devices. Because of this limitation, computers could not be used as communication and educational medium. Their usage remained confined to data processing, information systems, physical process modelling and control applications. With the increased processing power and storage capacity, a new communication medium has become available. Computer based "Interactive Multi-media" is now facilitating the simulation, extension and integration of various communication technologies to facilitate multi-sensory communication and learning.

Technologies are not mere exterior aids but also interior transformations of consciousness. The form and the structure of the discourse has been influenced by the affordances of different tools. All communication technologies have their strengths and weaknesses that are gradually realised after some years of initial experimentation with the technology as a communication medium. It took several decades of book printing for a useful and generally acceptable book form to emerge out of the tradition of costly medieval manuscripts. For several years, motion picture directors continued to use the new medium as theatre, and it took quite some time for producers to stop using television as glorified radio. Interactive multi-media technology also will soon be able to create a niche place for itself out of the legacy of the earlier media.

Computers offer interesting novel possibilities of interactivity and of integration of data, information, analytical interpretations and creative expressions. The issues being addressed by researchers and practitioners engaged in the area of Interactive Multimedia can be broadly abstracted as follows:

- Recording, Rendering, Transmission, Storage and Retrieval of Multimedia Data, Information, Analytical interpretations & Creative expressions.
- Synthesis of Multimedia Information, Analytical interpretations & Creative expressions.
- Analysis of Multimedia Data, Analytical interpretations & Creative expressions.
- Design and development of Multimedia Communication Systems.

Amongst other social activities, education ranks very high as one of the main beneficiaries of advancements in communication technologies. But unfortunately, it has not been the first to take advantage of some of the key advancements. It is the entertainment industry which has made the largest investments in applying the upcoming communication technologies. Though cognition is an internal and subjective process, it gets greatly effected by the way the study material is made available to the learner. Technology, if appropriately applied, can support cognition and enhance the learning. The design requirements of educational software using any of these technologies are not the same as that of an entertainment software. While media experts can exploit the communication technologies for developing entertainment and informative software, the educationists themselves must play the main role in designing and developing the software for pedagogical purposes.

High duplication costs of the non-textual study material has been a major deterrent against democratised learning. This problem can now be solved by the digital technology because rapidly reducing duplication cost of digital content is media independent. It is now feasible to provide instant access to large amount of duplicated primary content to much larger population in a very cost effective manner. Rapidly decreasing costs of multi-media ready computers will soon take them to almost all middle class families of most of the countries. Educational software will take a major share of computer software on such home computers.

The recently developed and quickly expanding field of Cognitive psychology throws a very useful light on the learning process. A closer look into the process opens up interesting opportunities to the designers of Interactive Multimedia Educational Software. Learning is multistage process and results into formation of higher level mental constructs known as Cognitive Maps. Oriented learner gradually makes a transition from an intelligent but mostly passive receiver to an active information collector and finally to a researcher. Different kind of cognitive activities are performed during different stages. Learning results into mental encoding of knowledge which is internally represented by multidimensional higher level mental constructs known as Cognitive Maps. Faithful external representation of these internal cognitive maps results into efficient teaching. A novel generic knowledge representation scheme to externalise the Cognitive Maps has been formulated and applied to all the ongoing projects by our group.

Digital technology is helping us to redefine the notion of the book from a static and linear collection of limited visual content to a dynamic and non-linear corpus of large body of multimedia content. The proposed model has evolved out of the desire to support the learning process at all stages and extend the 'Book' paradigm. Computers ability to store large volumes of instantly available data, to represent any structure or behaviour, and, to integrate multiple elements are three underlying strengths on which this model is based upon. It tries to harness the power of interactive multimedia by offering extensive study material and pedagogical tools. Special attention has been paid to enhance the interactivity. Effective mechanisms have been proposed to facilitate uniform and quick exploration, rendering and analysis of large digital corpus of primary, secondary and tertiary content. In short, the proposed model tries to free the 'Book' from the constraints of the paper.