Interactive digital TV: an experiment on the dissemination of content in the health sciences

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"Biblioteca Digital Multimídia" (Digital Multimedia Library, www.bibliotecamultimidia.org.br) is an ambitious project for disseminating free on-demand and real-time content (video, audio, text and images) using simultaneously two different transmission media: public Internet and digital satellite broadcasting. The project was implemented by the Embratel Institute, a not-for-profit institution founded and maintained by the Embratel telecommunications company, with support by funds from the Ministry of Culture, the National Library Foundation and several private companies such as Siemens Brazil and StarOne satellite provider. Among several other excellence centers, the Edumed Institute was chosen as a partner to generate contents (video broadcasting as well as distance and on-line courses) specifically in the area of health sciences, and was equipped with a small TV studio in its premises. Content is generated via a Polycom FX Clarity videoconferencing dedicated machine, which transmits via ISDN at 512 Kpbs at SVHS quality to the data hub and teleport of Embratel/StarOne facilities located in Guaratiba, Rio de Janeiro. High-capacity (up to 2,000 simultaneous users) Internet video unicasting and IP satellite multicasting servers stream the content according to a 24-hour program grid. Low quality, compressed copies of all video streams are stored at an on-demand high-capacity (2 Tb) server, available on public Internet. A network of 80 VSAT remote receiving stations has been established, mostly at public libraries across the country. The Edumed Institute generated four series of programs with short 20- to 30 min lectures and interviews featuring medical topics to lay people, delivered by experts), in collaboration with several universities of the Edumed Consortium, such as the State University of Campinas: 1) Health & Life On-Line, 2) Brain & Mind, 3) Health, Myths and Truths and 4) Speak, Doctor! In order to provide an interactive channel, we have developed a Virtual Auditorium consisting of a webpage with two panels: one at the left, receiving the streaming video through a Microsoft Windows Media Player 9, and one at the right, with access to a text-based chatroom. In this way, participants watching the broadcasting can send questions in real time to the lecturer or speaker, who will respond. The resulting chat script is stored. In addition, the Virtual Auditorium has a website which can be used to make available PowerPoint slides, articles, recommended links, a webforum, etc., related to the presentation, thus enriching the experience. We have also used this system to deliver a number of on-line courses with synchronous and asynchronous video lectures on several subjects, such as the history of neurosciences, functional neuroanatomy, occupational health, pediatric oncology, etc. The combination has been proved to be a very cost-effective and efficient way to deliver interactive digital TV either via satellite broadcasting supplemented by a terrestrial Internet link, or via an entirely Internet-based solution. Video transmission bandwidths of 128 to 256 Kbps have been found to be the minimum accepted quality. Common

difficulties have been all in the reception side of desktop users, mainly fluctuations in transmission bitrate and quality, audio and video freezing and audio/video dissociation, so that we presently recommend the satellite/Internet duo. *Acknowledgements:* This work was made possible through a grant of Metron Inc., through the Law of R&D in Informatics (Ministry of Science and Technology Special Secretary of Informatics), and grants by the Instituto Embratel 21 through the Law of Culture (Ministry of Culture), as well generous grants of equipment and connectivity from Siemens, StarOne, TES and Metron.

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