Internet Provides Interactivity to Educational TV

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Abstract

The interactive educational television system proposed in this paper enables the participants in a satellite TV session to view and hear the presenters via a typical satellite broadcast system and interact with the presenters and each other using an Internet computer conferencing system. Thus it consists of two parallel information systems operating side by side, with the added ability to display the Internet conference output on the television broadcast. The base layer consists of a typical satellite TV broadcast system. The second is an Internet multiuser conferencing system, such as a multiuser dimension (MUD).

In this paper the current educational delivery services termed 'interactive television' are surveyed, discussed and the need for interaction using Internet is described. Practical plans for educational system implementation are proposed.

It is argued that the proposed system enables an optimal level of interactivity in satellite teaching and learning for topic areas where immediate student questions and discussions are essential for overcoming learning bottlenecks (Tuovinen and Hill, 1994). It is also argued that this system is a particularly cost effective means of distance teaching and learning for Australian school systems, TAFE and university education.

Keywords

Internet, interactive television, educational television, educational technology

1. The Interactive Television Scene

Since the earliest days of educational broadcasts on radio and television the difficulties due to limited or slow student interaction with the course providers have been recognised.

Apart from using mail for assignments to be marked, distance education providers have used the following methods to overcome the feedback limitations:

1.1 Audio feedback

Telephones have been used by the recipients of satellite broadcasts to inform the presenters at the broadcasting studios of their views and needs during the broadcasts. In addition audioconferencing has been used to enable groups of participants to share in the discussions (Elliott, 1992). Depending on the topic this method can be quite effective for a small number of participants, except no record of the interaction is provided for the participants, and shy people feel intimidated about speaking in front of many strangers. It is also difficult to manage the responses from large numbers of people, and connecting large numbers of telephone systems to the studio presents logistical problems common in establishing multi-party teleconferences.

1.2 Fax

Another common method of the recipients responding to the broadcast is via faxed messages to the studio (Elliott, 1992). In this form of response both the sender and the receiver will be able to maintain a hardcopy of the interaction, and it allows for typed, handwritten and drawn communication. However, there is no interaction among the participants, except through the broadcast hub itself, and the rest of the audience may not be able to view all the contributions or retain their contents.

1.3 Audiographics (Telematics)

Audiographics or Telematics involves the simultaneous use of linked computers and audioconferencing between two to six separate sites (Tuovinen and Boylan, 1993). The audiographic computers are connected to each other via modems or other networks, allowing for immediate display of typing or graphics being created on any computer in the network. At the same time the computer work, or any other topic, may be discussed between the participants via the audioconferencing system. Audiographics may be regarded as an interactive electronic blackboard linking the participants.

In the Victorian interactive television trials, audiographics were used for interaction between the studio and recipients, or among clusters of recipients (D’Cruz, 1990; Elliott, 1992). The reason for linking a cluster of recipients together into an audiographic session was to set up suitable sized tutorial groups, since the technical hassles of linking up any more than four or five audiographic units becomes too time consuming (Braggett et al., 1995), and the management of the larger numbers of participants faces the double difficulties of audioconferencing limitations as noted above, and managing computer linked electronic blackboard systems.

1.4 Videoconferencing

Videoconferencing or slowscan television link from recipients to the studio has been a popular choice of feedback from the recipients to the presenters at the studio for systems with significant budgets for the equipment required, the hire or acquisition of adequate bandwidth links and the funds to pay for the support staff required (Baker, 1994). In addition the videoconference generally needs dedicated videoconferencing studios at the recipients’ sites, although it will be worth exploring computer based videoconferencing over the Internet, to see in what situations it provides an effective feedback link for interactive TV (Archee, 1995). Managing large numbers of videoconference sites and participants poses its own barriers to participation and flexibility of use.

A rough hierarchy of interactive technologies employed as the feedback mechanisms alongside various forms of broadcast television is described in Figure 1.

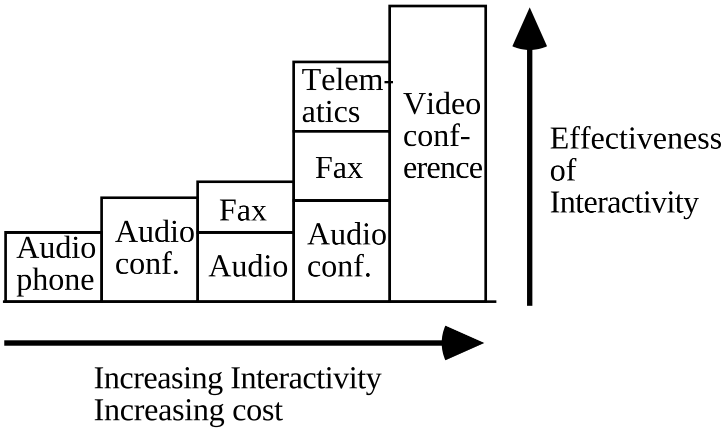

Figure 1. Hierarchy of interactive TV feedback mechanisms.

Duning, Van Kekerix and Zaborowski (1993) write about a similar set of historical phases through which electronic distance education technologies have progressed to the wide variety of choices available today.

Interestingly some distance education providers operate interactive television broadcast systems (presumably including one or more of the above forms of feedback) and computer conferencing networking systems separately, from the same institutions (Smith, 1994).

2. Integrated Satellite TV / MUD (ISTM)

This paper suggests that effective interaction between the TV broadcast providers and the recipients can be provided by linking everyone participating in an educational satellite TV broadcast session to an interactive *multiuser dimension* (MUD) computer conference on Internet (Engst, 1994; McCloy, 1995). The MUD environment allows all the participants to type in their comments during the broadcast, enabling everyone to see the comments in real time, and the comments are recorded for subsequent review.

This form of interactive educational television system could be called *Integrated Satellite TV / MUD* (ISTM) system. It enables the participants in a satellite TV session to view and hear the presenters via a typical satellite broadcast system and interact with the presenters and each other using an Internet computer conferencing system. In fact, it consists of two parallel information transmission systems operating side by side, with the added ability to display the Internet conference output on the television broadcast. The base layer is a typical satellite TV broadcast system (D'Cruz, 1990; Elliott, 1992; Ramsay, 1992). The second is an Internet multiuser conferencing system.

Diagrammatically, the two systems could be shown to operate independently, except that the educational providers at the studio are interacting with both the satellite TV presentation and the MUD, and that they can display the MUD contribution on the satellite broadcast if they wish (see Figure 2).

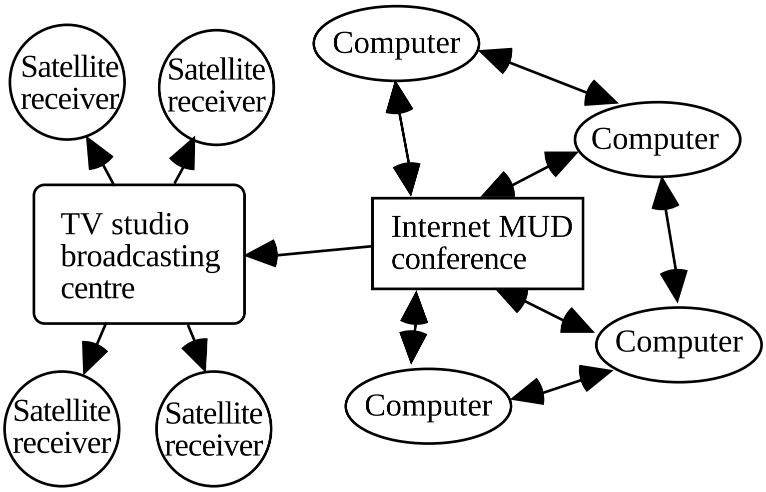

Figure 2. ISTM interactive TV system.

This method of interactivity is worth trialing in Australian distance education because the audio and fax feedback mechanisms offer only very limited and intermittent (especially fax) range of responses to the broadcasts. The Telematics links are difficult to set up and maintain for more than a few groups (Braggett, et al., 1995). The high level of interactivity provided by the videoconferencing is very expensive in equipment, support, bandwidth of communication (although this is reducing) and cost of the communication channel use, and it is difficult to maintain and manage.

In contrast the ISTM system uses common satellite broadcasting and receiving equipment (which already exists at many school, TAFE and university sites) alongside ordinary computers connected to Internet via modems along either common telephone lines or through educational institutions' propriety local area and wide area (LAN and WAN) networks. Thus the participants in an educational ISTM event can be located at home or in study centres, each equipped with a satellite receiver dish, a decoder, a television and usually a videocassette recorder for the TV broadcast and computer equipment with Internet access software, connected to a suitable Internet provider through a modem or dedicated institutional network.

The ISTM system principally enables the students to comment and question the subject matter before, during and after the TV broadcast. This extensive interactivity with peer learners and teachers should be urgently tried in educational contexts where student results, subject evaluations and other evidence, as discussed in a recent paper by Tuovinen and Hill (1994), point to learning bottlenecks due to a high cognitive load during current non-ISTM broadcast sessions.

The ISTM system enables the shy participants to type their contributions to the MUD without having to speak to such a large group. The effect of computer conferencing empowering and encouraging the disadvantaged groups by stripping away the reminders of status in communication interchanges was noted by Shoshana Zuboff (1988) in her study of a business computer conference system and its effects on the participants. Other writers, such as David McConnell of University of Bath have also remarked on the better opportunity all participants have for voicing their contributions in a computer conference system than in a face-to-face meeting (McConnell, 1988), let alone speaking to a crowd of strangers they cannot even see.

It also allows for a record of the discussions to be maintained at the MUD itself, as well as being saved on the participants' computer disks. The MUD conversation threads may be inspected at a later time, and further contributions can be made to the conference over time (Engst, 1994). Thus the learning session is not limited to the real time session when everyone attends to the broadcast simultaneously, but rather an ongoing educational dialogue may be established among participants. This is a very useful feature, because it emphasises the transactional and developmental nature of knowledge, where instead of learning predigested information the student comes to view learning as an entry into a community of ongoing discourse for cultural improvement. This is put rather aptly by Michael Oakeshott and quoted by Paul Hirst in *Knowledge and the Curriculum* (Hirst, 1974):

> As civilised human beings, we are the inheritors, neither of an inquiry about ourselves and the world, nor of an accumulating body of information, but of a conversation, begun in the primeval forests and extended and made articulate in the course of centuries. It is a conversation which goes on both in public and within each of ourselves. Of course there is argument and inquiry and information, but wherever these are profitable they are recognized as passages in this conversation, and perhaps they are not the most captivating of the passages ... Conversation is not an enterprise designed to yield an extrinsic profit, a contest where a winner gets a prize, nor is it an activity of exegesis; it is an unrehearsed intellectual adventure ... Education, properly speaking, is an initiation into the skill and partnership of this conversation in which we learn to recognize the voices, to distinguish the proper occasions of utterance, and in which we acquire the intellectual and moral habits appropriate to conversation. And it is this conversation which, in the end, gives place and character to every human activity and utterance.

3. Proposal for Introducing ISTM to Distance Education

If a distance education provider was interested in implementing an ISTM system the following proposal presents one step by step approach.

3.1 Schedule

Stage 1
Conduct a pilot 4-5 site (in addition to the broadcasting hub site) project over six months investigating the process of delivering interactive television education using a satellite broadcasting facilities linked with an Internet MUD feedback loop. Preparation and training to be conducted during the previous 3-6 months.

Stage 2
Expand the reach of the ISTM system to more of the institutional locations and for other educational areas (subjects) in the following six months.

Stage 3
Expand ISTM to non-institutional sites and individual access after stage 2.

3.2 Objectives of the ISTM program

- establish a working ISTM infrastructure and delivery system throughout the distance education system including appropriate personnel, equipment, sites, organisation and course context.

- investigate the effectiveness of the ISTM distance education delivery method.

- evaluate the optimal educational and social benefits and limitations of the ISTM delivery system.

- investigate the cost of educational distance delivery via ISTM and ways to improve its effectiveness.

- investigate the ability of the system to originate educational programs from outside the main studios using ISTM delivery methods.

- seek to improve the cost / effectiveness of distance education beyond the ISTM delivery by refinement of the system and by developing innovative improvements.

3.3 Methods of Evaluation

Data could be gathered for quantitative and qualitative analyses. The data might consist of records kept of the quantitative items, surveys and interviews with participants, observational records from ISTM sessions and student result analyses.

Data ought to be sought on:

- costs involved in equipment acquisition, installation, maintenance;

- work involved in setting up and maintenance of Internet MUD environments, their linking with the satellite broadcasts;

- training costs and work involved in preparing educational planners, teaching staff, production staff, support staff and students to use ISTM;

- costs of operating the system; and

- the perceived nature and effectiveness of the ISTM as a teaching and learning medium.

The data should be analysed progressively throughout the program to identify any areas requiring more detailed attention. After each stage a comprehensive evaluation report should be produced, to guide further distance education developments.

3.4 Facilities Required

People
- Project co-ordinator / evaluator.
- Satellite TV production team - as in a normal satellite TV broadcast delivery.
- Computer / TV system technician(s) at satellite broadcast studio to integrate the TV production and MUD connection.
- Computer / TV system technicians for all participating sites.
- MUD developer and maintainer(s).
- MUD trainer(s).
- Educational planner(s), producer(s) and instructional designer(s).
- Educational presenter(s).
- Accountancy, administrative and secretarial personnel.

Equipment
- Satellite TV broadcasting facilities.
- Internet server, with capacity for multiple connections and to develop and house a MUD.
- Satellite receiving dish, decoder, TV and videocassette recorder at each receiving site.
- Computer, modem (or direct Internet cable network connection) at each receiving site, and at the development, evaluation and training sites.
- If groups are larger than two at a given site, provide either one computer for two people, or one computer and multiple linked keyboards, mice and display of the screen via a large monitor or LCD overhead projection system.

- Alternative systems (say half of the sites in Stage 1) where the television tuner and display is incorporated in the computer that is used to access the MUD in addition to the external satellite reception dish, decoder and videocassette recorder.

Sites

- Broadcast studios.
- Two institutional sites.
- Two home sites of distance education students.

3.5 Organisation

Stage 1

- Project team to be assembled.
- Identification of the teaching / learning context, e.g. subject to be taught and student cohort.
- Planning of the delivery approach and educational materials.
- Development of the educational materials to be used (may be possible to adopt or adapt existing materials).
- Development of the MUD environment to support the satellite broadcast.
- Choice and adaptation of the equipment for the receiving sites.
- Purchase, installation and testing of the equipment, links and their capacity, e.g. the speed of response to keyboards, etc.
- Training of the technicians, teacher(s) and students in the use of the integrated system.
- Delivery of the study program.
- Data gathering throughout the program.
- Evaluation.

Stage 2

- Project team to be expanded to cope with larger clientele.
- Identification of the teaching / learning context, i.e. subjects and students.
- Planning of the delivery and materials.
- Modification and development of the educational materials.
- Modification and addition to the MUD environment.
- Choice and improvement of the equipment for the receiving sites.
- Purchase, installation and testing of the equipment and links.
- Training of participants.
- Delivery of the study program.
- Data gathering.
- Evaluation.

Stage 3

As above for Stage 2, taking into account the requirements of the sizes and locations of the students and teaching staff.

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