MINIMUM REQUIREMENTS FOR EFFECTIVE DISTANCE TEACHING SYSTEMS

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1. INTRODUCTION

The first practical video conferencing systems were introduced at the Fourth World Telecommunications Forum held in Geneva in 1983 [Eva95], but their use is still rare. By comparison, the personal computer, introduce about the same time, is now a commodity sold by the millions.

That is surprising, considering the cost and time savings associated with teleconferencing and the economy of scale achievable by teleteaching.

This paper presents the position that lack of quantity and quality in the transmission process are responsible for the low success.

2. INFORMATION QUANTITY

A typical classroom, as viewed by the students, has four essential elements:

1.the general environment, that should provide good working and viewing conditions;

2.semi-static display elements, like slides, charts, maps; the information contained changes slowly and a few times during one class;

3.dynamic elements, represented by the blackboard or flip chars, were information is dynamically constructed during one class;

4.the teacher.

Classrooms have that organization for centuries, and with small variations are used worldwide in all levels of teaching. Changing this paradigm is always uncomfortable - remember the last time you attended a class or seminar in a room that requires removing the projection screen to use the blackboard.

This organization is not arbitrary. Good general environment includes several aspects, but for our purpose the main requirement is a well-lit room.

The semi-static element is a reference of content or indicates the order and sequencing of subjects; the dynamic element shows the details or the construction of the subject, and the teacher transmits still more dynamic information, and orchestrates all activities.

Contrary to this tradition, most teleteaching systems try to put all the information in a single, and usually rather small screen.

A realistic teleteaching environment should provide the four elements described above. If wall size and hi-resolution displays were available, all elements could be displayed in that display. Since that kind of displays do not exist, elements 2, 3 and 4 should be presented in separate screens, with size compatible with the number of students.

3. IMAGE QUALITY

The low quality of the transmission of details in the teacher's image precludes the transfer of information of subjective nature, present in behavioral details, frustrating the communication process. Studies have shown that in interpersonal communication, about 7% of the communication is transmitted by the content of the word uttered, 38% by the utterance intonation, and 55% by image. The exact numbers may be disputed, but it is clear that much of the information present in interpersonal communication is conveyed by gestures, small physiological reaction, changes in skin tone, and other minute details.

The importance of subjective of components is easily shown by the study of the evolution of voice synthesis systems. They only achieved practical and widespread use after the subjective aspects of the synthesized voice were fully understood. The same holds for the image aspects, and this is the fundamental point to be accessed to build practical telepresence systems.

As discussed in [1], it seems that HDTV [2] resolution is good enough to carry the image's minute details required; MPEG color compression is probably too lossy for the standard of chromatic detail required.

4. CONCLUSION

Quality and quantity of information are essential for making teleteaching realistic, delivering the full promises of the technology. Costs of equipment and telecommunications are going down continually, and what is called hi-end video systems will be commonplace in few years. It is time to start researching high quality systems for teleteaching.

5. REFERENCES

[1] Campos, G L. "Technical Requirements for Realistic Telepresence", Teleteaching '98 - Distance Learning, Training and Education – Part III, XV IFIP World Computer Congress, Vienna, Austria/Budapest, Hungary, August 1998, 77-84.

[2] EVANS, B. "Understanding Digital TV", IEEE Press, Piscataway, NJ, 1995.