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The Video Teleconference - A Valuable Academic Tool



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The video teleconference has come of age! Easy-to-use and efficient, it is advantageous to become familiar with its operation.

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The Issue

In the autumn of 2005, *Cégep@distance* began the design of a course to develop on-line guidance skills for tutors at cégep@distance and other teachers from the collegial community. Funded by the Inukshuk Wireless Learning Plan and developed in partnership with PERFORMA, this course presented the pedagogical potential of different information and communication technologies. The video teleconference was one of these. In Spring 2007, Françoise Marceau, project manager at the pedagogical development arm of *Cégep@distance* since 2004, Hélène Martineau, teacher at *Cégep François-Xavier-Garneau* and president of APOP since 2003, and myself, project manager at the research arm at *Cégep@distance* since 1995, currently on leave for professional activities at the *Société de formation à distance des commissions scolaires du Québec (SOFAD)*, participated in the test run of the course module dealing with the video teleconference. I have revised, restructured and enriched the work resulting from that activity in order to produce this report for Profweb. I would like to thank Hélène for her comments on the penultimate version of the text and give a special thanks to Françoise who worked with me and was an unending source of constructive criticism throughout the production period. To the reader, I hope that you find this report useful and interesting.

The video teleconference has become quite popular in the Quebec collegial network. Although used recently as the medium for APOP's E-conference U. R. on Line (January 2007) and for projects like *Cégeps en réseau* which depend on the video teleconference as one of their technical mainstays, it should be noted that this platform had already been integrated into distance education for several years, notably by the *Groupe Collegia. A téléprésence* wall developed by the *Société des arts technologiques (SAT)*, the video teleconference Via, as well as DECclic from the *Corporation Plateforme collégiale DECclic* were the three technologies selected at the beginning of the project.

It is important, therefore, to define exactly what is meant when the term video teleconference is used.

Videoconference or Video teleconference?

Although this report is focused on the video teleconference, it is important to discuss the videoconference as well in order to dispel the ambiguity that exists between the two terms. The two technologies both transmit voice and image to facilitate long distance face-to-face communication. Other than this point in common, these two technologies are the products of two very distinct evolutions. (Translator's note: In English "video

teleconference" is used much less frequently than the term in French which is "visioconference". Perhaps because of the length of the term in English, there has been a greater tendency to combine the two terms and use the word "videoconference".)

Videoconferencing for business and Video teleconferencing for team projects - two distinct approaches!

The videoconference appeared during the 70's using satellite transmitted data notably from the Canadian satellite Anik launched in 1972. The great leap forward for this technology was its reciprocity. Audiovisual information made a round trip in the videoconference whereas the television was only one way.

During the 80's, the videoconference became multidirectional thanks to relays. Several locations could be connected to a relay which would retransmit data. Participants in Africa could connect with colleagues in Europe and North America simultaneously.

The video teleconference only came on the scene in the 90's. It used the same digital channels as the Internet. Whereas the videoconference required specially adapted rooms, the video teleconference required no more than a personal computer equipped with a webcam, a headphone, a microphone and Internet access.

Around 1995, MicroSoft and Cornell University each developed a video teleconferencing software. MicroSoft developed NetMeeting and Cornell CuSeeMe. Both softwares were freeware. Their weak performance stemmed from their dependence on the Internet, which at that time simply did not have the bandwidth to effectively accommodate such technology. Audio communication on Netmeeting was limited to two people. When a third participant connected, the voice simply disappeared and participants were limited to text messaging. NetMeeting contained several interesting features in spite of this drawback. There was a whiteboard with resident applications (for a definition of these functions, refer to the section [Focus on Function](#) ahead in this report). The collaborative potential of the medium was evident notwithstanding the network limitations, and as the Internet has become more dependable, video teleconferencing has become increasingly varied.

How the two technologies are used

In its early days the videoconference was used by businesses and universities for group meetings. Businesses saw the advantage of holding meetings virtually when participants could not be together physically. Although not inconsiderable, the costs attached to a videoconference often operated by telecommunication companies such as Bell Canada were cheaper than the transportation charges required for a face-to-face meeting. The universities used this technology to permit wider access to limited resources. Specialized teachers are not available nationwide and to deal with this reality, certain secondary schools in the U.S. also installed videoconferencing facilities. A model of distance education emerged consisting of students in specially equipped rooms linked by a dedicated videoconferencing infrastructure to a teacher in another location.

In Canada, francophone communities outside of Quebec, often located at great distances from cultural resources, adopted this model. The *Collège des Grands Lacs* (Great Lakes College), founded in 1995, linked five francophone communities in eastern Ontario. In Acadia, a similar system linked francophone communities in Nova Scotia, Newfoundland and Prince Edward Island.

In other countries, such as Great Britain and France, in Quebec and in other Canadian provinces, distance education was based on a model of autonomous individual learning, and so, these systems were little used because of the limitations engendered by the need to assemble in specially equipped facilities.

During this time, several groundbreaking experiments in video teleconferencing were being done using the Internet for a more individual approach to distance education. In Quebec, several experiments were subsidized by the *Fonds de l'autoroute de l'information* at various scholastic levels notably at the collegial level. *La Virine APO* (now *Vitrine Technologie-Éducation*), *l'Institut maritime at Rimouski*, *l'UQAM*, the *Centre collégial de formation à distance (CCFD)* (now *Cégep@distance*), the *Cégep de Jonquière* and the *Cégep de Chicoutimi* participated in these experiments between 1995 and 2000. They facilitated the evaluation of the evolving user-friendliness of these systems. These efforts were often government subsidized and confirmed the need for more development of the Internet. In the 90s, several cegeps, notably those who had several campuses, installed videoconferencing facilities using funds supplied by programs such as PAAPNTIC supplied by the *Ministère de l'Éducation*. The use of these facilities, however, was limited at best and included administrative meetings of regional staff.

In fact, in the collegial network, it has been a relatively recent phenomenon to have enough bandwidth to use video teleconferencing thanks to the highspeed Internet connection offered by *RISQ (Réseau d'informations scientifiques du Québec)*. Furthermore, the use of highspeed connections has encouraged the development of platforms for collaboration that accommodate multiple images as well as voice transmissions. The traffic on these platforms in-province has fostered the creation of home grown technologies by firms that originally distributed American products. By the middle of the first decade of this century, Quebec had software for bilingual synchronous distance communication that allowed true collaborative work.

But why use Video teleconferencing?

After this brief historical capsule of the development of the technology, the question of how and why video teleconferencing should be used by college teachers will be addressed.

First, the teacher must determine whether this tool is pedagogically correct for his/her course. The decision must take numerous factors into consideration and rather than go into detail, a schema which summarily describes the evaluation has been developed. The main steps are as follows:

1. Identify the pedagogical approach
2. Determine the pedagogical model

3. Choose a strategy among the 11 models proposed
4. Create a scenario taking pedagogical process and available resources into account

The examples of scenarios proposed at the bottom of the schema can equally be a source of inspiration.

There are classical pedagogical strategies for presenting information supported by visual elements, role-plays, guided explorations of text, software and websites as well as a review session. The possibilities for video teleconferencing are endless. Below are two video clips of interviews in French that show concrete examples of how it can be used:

- In the first entry on the playlist of the video player below, Frédéric Aubrais shows how video teleconferencing can be used to simulate a conversation with a client.
- In the second entry, Marie-Pier Morin, teacher in Early Childhood and Primary Education at the University of Sherbrooke and Réjean Fournier, teacher in the Laboratory Technology Program at *Cégep de Sherbrooke*, present several advantages of video teleconferencing during apprenticeships.

Most examples are often limited to lectures, and the literature on the subject proposes few different models. Things are changing however. Certain teachers at cégeps and universities in Quebec are using the video teleconference to virtually provide expert supervision of students during apprenticeships within Quebec or elsewhere. Other initial uses of video teleconferencing in Quebec have included *Cégeps en réseau*, APOP's e-conference U R on Line 2007 and on-line workshops as well as the distance education offered by the Groupe Collegia. Each of these examples will be briefly described below. It is hoped that they will serve as sources of inspiration to motivate the reader to experiment with the medium of video teleconferencing.

Examples

Cégeps en réseau

The project *Cégeps en réseau* was a techno-pedagogically and organizationally innovative response to the challenges of teaching small groups in college technical training programs. The project used information technology (IT) to link schools teaching small groups the same subjects. The success of the project depended on cooperation at several levels - between teachers, between IT representatives, between administrators and schools. Collaboration was also required among students because the project favoured cooperative activities (Poellhuber et al., Project *Cégeps en réseau*, research paper, version dated March 17, 2007). You can consult an [account of the experiment](#) (in French) by Geneviève Lizée of *Cégep de Drummondville*.

The first results of this project indicated that the most common teaching model was still the lecture (Poellhuber et Chomienne, [Actes du colloque de l'AIPU](#), 2007, pages 993 à 996). The results also demonstrated, however, the importance of teacher training about the pedagogical possibilities for collaborative work on synchronous platforms. Shortly after the beginnings of the experiment, teachers

requested such training. After the start of this training in December 2006, scenarios and other examples of collaborative work began to emerge.

The e-conference of APOP in January 2007

In what is believed to be a first in Quebec, the e-conference of APOP in January 2007, was held as a completely virtual venue. About 350 participants were registered for 121 activities. With great attention paid to logistics by the organizers, the event was a success. A very positive review of the proceeding was published in the newsletter [CLIC](#) (in French).

The symposium wanted to foster a virtual assembly for the discussion and exchange of views that rivaled a face-to-face encounter. In doing so, it would reduce the disadvantages inherent in non-virtual assemblies such as travel time and expense, as well as the organizational and financial costs to institutions to promote continuing education. Finally the symposium envisioned the establishment of reliable and dynamic communication networks in the short to mid term using a site dedicated to a community of practice (user group) consisting of various categories of participants focusing on the topic of the postsecondary pedagogical integration of communication and information technology. To entice you to participate in such a symposium, watch excerpts from a keynote presentation by Zsolt Szigetvari and a clip from a workshop with Brent Reid. You can also visit the [APOP](#) site to learn about the next virtual meeting.

- [The Potential of Online Technology](#) (1 minute)
- [On-line Evaluation in a Competency Approach](#) (4 minutes)
- [On-line Interactivities](#) (2 minutes)
- [Application Sharing](#) (2 minutes)
- [Questions and Comments](#) (2 minutes)

APOP's Workshops

Besides the symposium discussed above, APOP has developed on-line workshops for continuing education since 2006. Whether in the category of *caravane_APOP*, *APOP_mobile*, or *APOP_taxi* these short modules are synchronous distance education. As the courses can be given at times convenient to users and there is no travel time or costs involved, the number of students who can benefit from such custom instruction is increased. The adaptation of content from face-to-face presentation to synchronous mode, however, requires considerable effort on the part of users as well as instructors.

Groupe Collegia

A consortium of several colleges, the Groupe Collegia was a province wide virtual continuing education resource. Classes leading towards an *AEC* certificate (*attestation d'études collégiales*) permitted students to recycle themselves in different fields without leaving home. Various courses were offered to students from all

corners of Quebec. At left, the last two entries on the video playlist are video clips where teachers discuss how they interacted with students using video teleconferencing.

- Suzanne Baril, a teacher in the Personal Insurance Agents and Brokers Program of Groupe Collegia in the *Cégep de Matane, de la Gaspésie et des Îles* and O'Sullivan, presents [how text messaging can be integrated](#) into a video teleconferenced course (2 minutes) in French.
- Frédéric Aubrais, a teacher in the same program, presents how the video teleconference can be an effective tool [to promote a link between teacher and student](#) as well links between students (2 minutes) in French.

Practical Applications

The following section suggests answers to the question of how to integrate the video teleconference into your teaching. It begins with a description of the functions of the video teleconference, a necessity for those wishing to use it in their pedagogy. Of course, mere description cannot replace practical experience with the medium. Practice sessions and support from an experienced mentor as well as role plays are all necessary preparations for effective video teleconferencing.

After exploring functions, we will present some guidelines for an effective start to your teaching using video teleconferencing.

Focus on Function

To our knowledge, there is no system of classification for video teleconferencing features. Consequently, we have arbitrarily created one for the purposes of this report. All are invited to comment or suggest alternatives which could be taken into account in a revised version. Our classifications are a result of our own experience and are limited to those communication features that are of pedagogical interest. We left out information management applications such as block notes for participant and moderator use and the posting of moderator documents. We have, however, added a short explanation of these features:

- As its name indicates, block notes permit participants to take notes during presentations which can be later transferred to a word processing application.
- As for posting moderator documents, this feature allows all participants to download information from the moderator before, during or after the session.

Furthermore, although there are several similar video teleconferencing applications, we have drawn examples from only one of them. This is in no way a particular endorsement of this product and is done solely for the purpose of illustrating the characteristics of these products in general.

Having stated the information above, we can now examine our video teleconferencing classification system which evaluates visual, oral and written interactivity for pedagogical purposes through analysis of the following features:

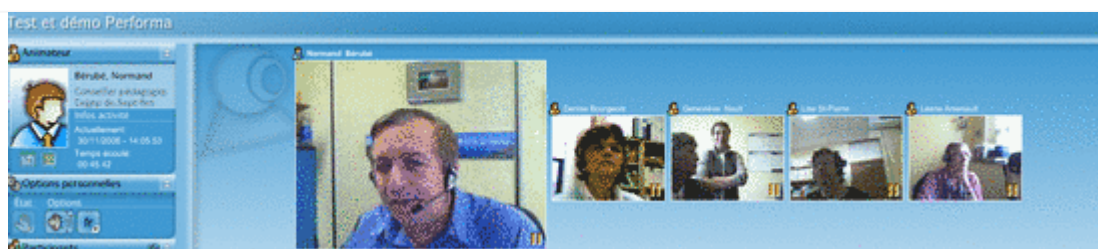
- Synchronous transmission of sound and image
- Written communication
- Collaborative work

The following text succinctly examines each of these categories with an emphasis on their pedagogical potential. Even though administrative functions such as session reservation and preparation are important, they are only mentioned at the end of this section. Evidently, they are a factor to be taken into account by those teachers who manage the use of the software.

Category 1: Synchronous Transmission of Image and Sound with Conversation Control Features

This section deals with the ability of video teleconferencing software to display live images of participants and to permit a real time conversation among them. Each participant must have a personal computer, webcam, microphone and Internet connection in order to see each other and converse as a group.

Images are displayed in different ways depending on the number of participants. The screen could resemble the image below. The number of participants who can have their image on screen varies according to the software and more particularly to the bandwidth of the connection.



Normand Bérubé of *Cégep de Sept-Îles* leading a session with PERFORMA staff

Each participant is equipped with headphones containing an integral microphone, which facilitates the give and take of conversation. As in any large meeting, not everyone can speak at the same time. The interference in such situations is multiplied in the video teleconference, and vigorous control is necessary. There is generally a toolkit to regulate communication in large groups. It generally includes a permanent list of participants who can indicate their desires. A 'raised hand' indicates the desire to ask a question, a 'thumbs up' means a positive response, a clock signifies a temporary absence etc.



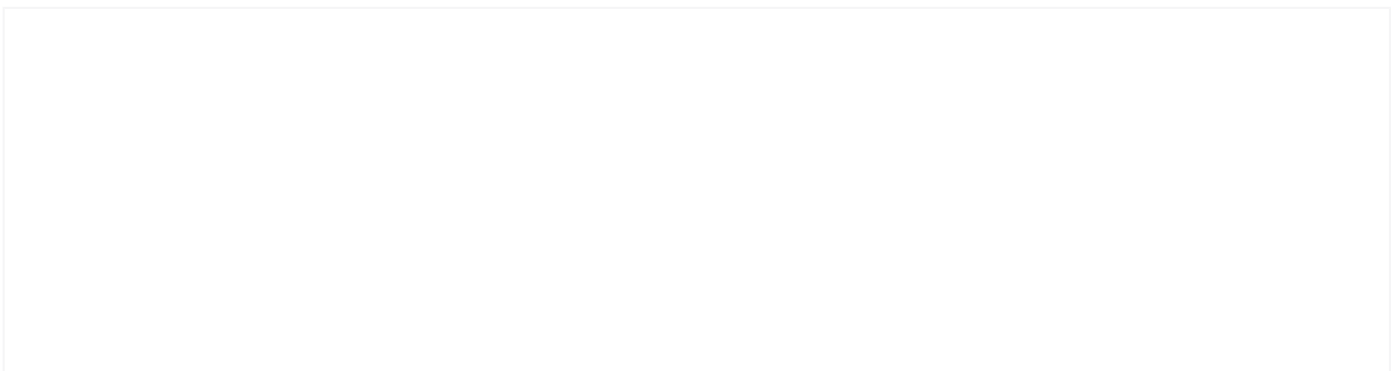


Clicking on your 'status' symbol allows you to indicate your wishes

Some people, notably teachers who have always worked in a face-to-face environment, attach great importance to seeing the faces of participants and being seen. Research shows, however, that this feature is largely of emotional value. This is supported by results from several research studies including the *Rapport du projet STEFI au Fonds de l'autoroute de l'information* (Potvin and al., 2000). It is of use during initial meetings to let participants get to know one another and to develop team spirit, but as it is an extremely heavy consumer of bandwidth, it is recommended after initial meetings to request participants to deactivate their cameras. Only the moderator should remain visible to the participants, who generally appreciate seeing the leader of the discussion throughout the session.

Category 2: Written Communication Features

Most systems contain a text messaging feature. This can be private for one on one communication, limited to several participants or public information within the group. Text messaging during a video teleconferencing session is of limited value. It can be compared to people not wishing to be intrusive and whispering quietly during an oral presentation. It can be used for quick comments between participants and between the moderator and a participant. Other than that, text messaging is of limited value when the features in Category 1 are functioning.



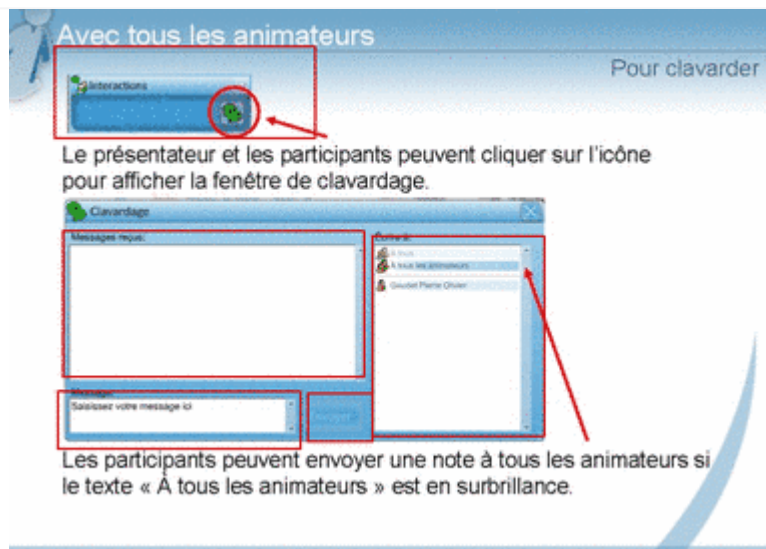


Illustration of the text messaging zone

Category 3: Collaborative Work

This last feature, which is a key difference between the videoconference and the video teleconference, is extremely useful for various pedagogical applications as well as the insertion of socioconstructive approaches. Simply described, these approaches are based on the interaction between participants in building knowledge. The gradual acquisition and analysis of information by participants is a part of the process of modifying their intellectual approach. Generally, there is a family of related features in this category:

- A shared whiteboard
- The ability to post PowerPoint presentations, Excel spreadsheets, pages of text (in Word, for example)
- Linkage to a website
- The ability to share applications
- An instantaneous polling function

The whiteboard permits all participants to write on an on-screen page simultaneously. Different marking tools or colours can be associated with each participant to facilitate identification in operations such as overwriting, underlining and circling of texts. It often falls to the moderator to establish the rules for participants to follow when using these tools. The page can be printed by each participant to conserve a record of the proceedings. In the first listing on the videoplayer at left, Suzanne Baril, a teacher in the Personal Insurance Agents and Brokers Program of Groupe Collegia explains [how she uses the whiteboard during a course](#) given using video teleconferencing (2 minutes) in French.

The posting features for PowerPoint presentations, Excel spreadsheet and certain other types of files by the moderator (or the current discussion leader) permit participants to see the material and follow the comments as the leader links the flow of audio and visual information. The moderator can send these files to participants

for downloading in advance for use during the session.

Linkage to a website is similar to posting but does not offer the moderator the control of participants' screens, as is often the case with posting features. The moderator simply sends students the web address which they open in their own browsers. The leader can orient participants within the site, but must be vigilant to not lose them.

Application sharing features are different from posting features in the sense that participants can intervene within the designated software on the screen once granted access rights by the moderator. The leader or moderator has the application files on their computer. This is a very interesting feature for technical courses which allows a student to gain practical experience on a software while eliminating the need and expense of multiple copies or licenses. It is possible to use this feature for web browsing as well.

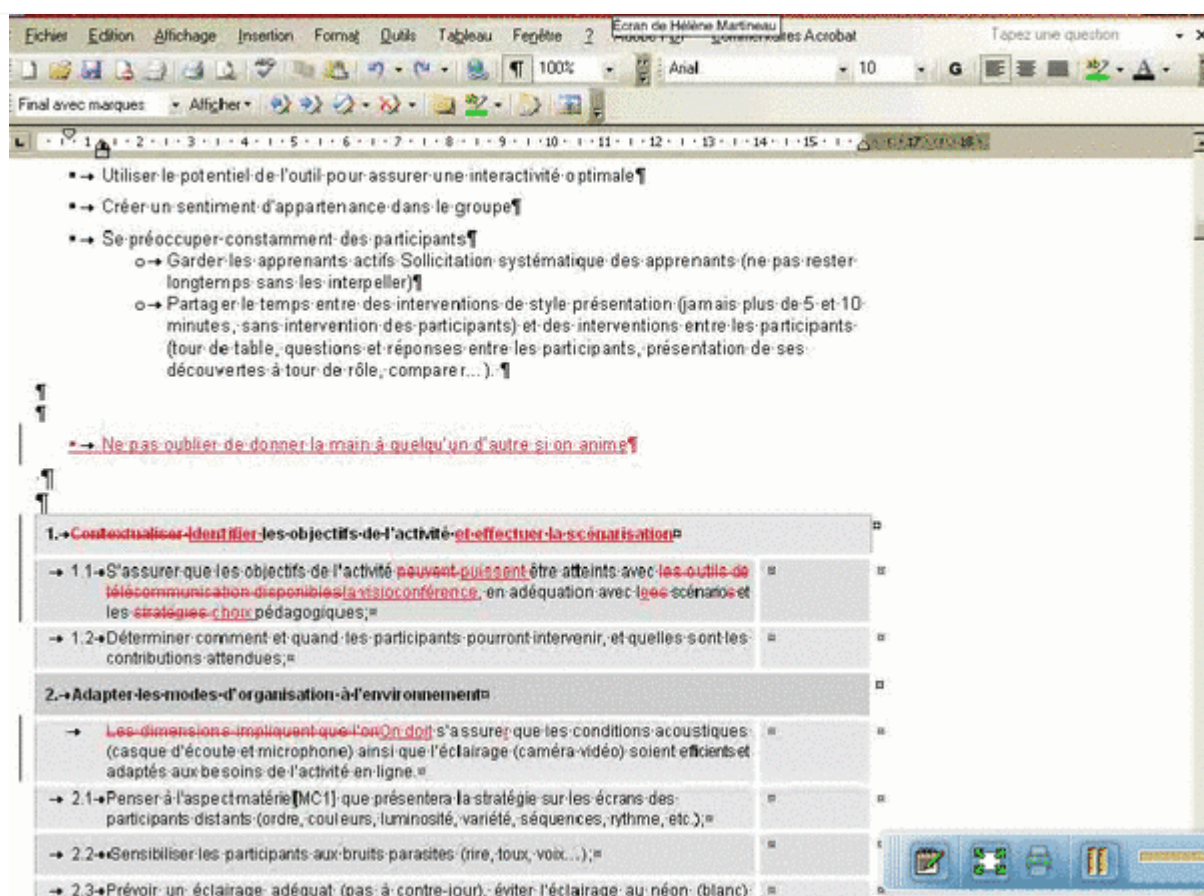
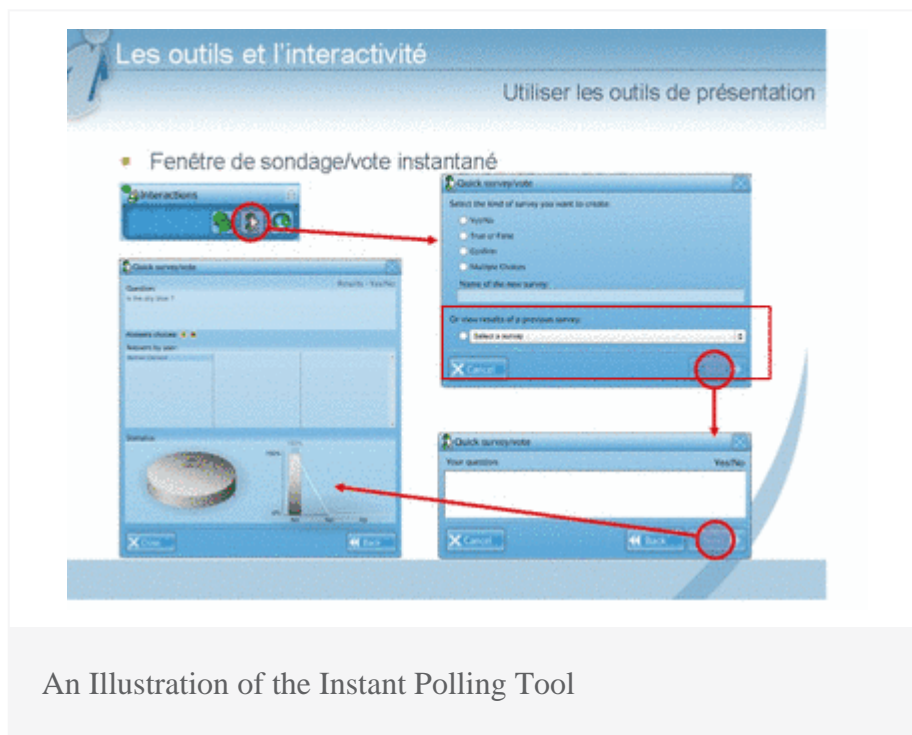


Illustration of Application Sharing of a Word File

Increasingly common on video teleconferencing software, the polling feature permits an instantaneous participant portrait based on responses to multiple choice questions, true-false statements or questions requiring short answers. Moderators can quickly determine if participants have understood, or are still interested in the presentation. The compilation of the responses is immediate and therefore so is the feedback to the moderator. Once again, you can listen to Suzanne Baril who discusses the [academic use of the polling feature](#) (5 minutes) in French.



An Illustration of the Instant Polling Tool

Finally to end this focus on features in video teleconferencing, we will discuss the session recording feature. This function is difficult to classify in the three above categories. Participants can view missed sessions either completely or in sections to review an explanation or other element.

N.B. The focus on features descriptions that we have presented do not touch upon the administrative aspect of the video teleconferencing platform. Obviously if you want to call a meeting, you must be certain that your school has an arrangement with an Internet provider. Afterwards, documents to be used during the session must be prepared and transmitted. The participants must be invited and given rights to communicate orally and visually. Don't forget that in certain academic situations it will be necessary for others to lead the discussion or to take a more active role, and this must be taken into account.

Principles and Recommendations

Even if academic research and literature on the impact on teaching of video teleconferencing is still rare and that what has been observed seems to indicate little use of the academic possibilities of the medium, it is still possible to create guidelines and recommendations for using this technology. These are being presented to close the report as well as an inspiration for action. With these principles in mind, you can undertake your exploration of video teleconferencing software. We invite you to share your experiences and comments with us. The more we know of the use of this medium within the college network, the more information can be disseminated to others.

Before going into specific guidelines, we would like to start with a general principle to remember:

Whatever its academic potential, video teleconferencing is only one technology among many and certainly not the best response to every situation. Even though it mimics the lecture format to a remarkable degree, it

should not be used uniquely for this purpose and should be considered in collaborative situations. Used in tandem with asynchronous technology, participants can benefit from both individual and group learning. Furthermore, it is only with a combination of learning strategies and tools that learning-centered scenarios will emerge.

Here are several more specific guidelines to help you get off to a good start:

- Insure adequate training for tutors and instructors

For us, this principle is principal! As with other technologies, teachers must be trained. For video teleconferencing, an accent on appropriate scenario development which includes diverse learning strategies such as case studies, demonstrations, guided tours and role plays should be part of this curriculum.

- Insure technical performance

This guideline, although in a completely different category from the first, is equally as important. Logistics in a video teleconference are a necessity. This principle will be touched upon in the last section of recommendations for successful video teleconferencing.

- Plan sessions rigorously

A video teleconference cannot be improvised. The flow of the session requires advance planning to the minute and documents used during the session must be prepared and distributed well in advance.

- Use features to their fullest to ensure optimum interaction

We can't say it enough, the video teleconference is not the medium for long lectures. Encourage student participation, ask questions, motivate them and listen to them.

- Use visual images

The technology permits both fixed and action images. Illustrating concepts and explaining processes using animated schematics are among the many visual strategies to employ.

- Build team spirit in your group

The lack of physical presence can be compensated for in several ways. Before forming teams, ask participants to introduce themselves to the group. Encourage on-line but off-subject activities.

- Keep your students in mind

Visual indicators are hard to perceive on-line. Other ways must then be found to gauge the understanding or confusion of students before they drop out. Asking questions, polls and requesting certain students to summarize what they have just said are all techniques which expose disinterested students who could drop out.

- Establish rules for communication, transmit them to participants and enforce them

As in face to face instruction, students cannot all speak at the same time. In a video teleconferencing

session, communication protocols must be clear, known and respected by all.

Finally, here are several recommendations for making a video teleconference a success.

These suggestions are in effect derived from the guidelines above and are organized into the following five categories:

- Plan your activities and scenarios with your objectives in mind
- Check the technical requirements of your activity
- Plan the management of your activity
- Verify compatibility between your Internet connection and the software to be used
- Supervise the flow of the session

To learn more about each of these recommendations, you can read the attached document called "[The Videoconference: Tips and Techniques for Presenters and Group Leaders](#)". There are suggestions within that you may find useful during sessions.

Conclusion

This report could have been named "Before taking the plunge!" or perhaps "Video teleconferencing - a tool to add to your IT toolkit"; we chose, however, "The Video Teleconference - A Valuable Academic Tool". Whatever the title, we wanted to make the point that the video teleconference has joined a host of other technological tools that teachers now have at their disposal. The goal of this article is to pique your interest by documenting the potential of the video teleconference and to motivate you to integrate this tool into your teaching.

Given that technology has made such strides in teaching, now is the ideal time to explore the possibilities that are now available to you.

We hope that you will take the time to share your discoveries and questions with your colleagues by using our Comments feature!

Useful References

- British Educational Communications and Technology Agency Becta, ICT Research (2003). What the Research Says About Video Conferencing in Teaching and Learning
This article analyzes the research results of the pedagogical use of video teleconferencing systems. It lists general advantages as well as advantages for students and teachers. It also gives advice about

initial training and troubleshooting for students experiencing difficulty in their mastery of the medium.

- Chomienne, Martine & Ginette Gauthier, CCFD, [Conception, développement et mise à l'essai d'un cours de formation à distance multimédia au collégial : résultats préliminaires](#), CLIC March 1998 - No 22 (site consulted September 9, 2007)

The article gives results of a trial of two elective course prototypes in the Social Sciences Program (Family 2) using an interactive broadcasting platform on the Internet done in 1998. These results uncovered the weakness of the technology at the time, and pedagogically, demonstrated the strengths of the medium such as a richness of available visual material.

- Guay, Pierre-Julien, [Le cours de Babel ou les malheurs du multimédia sur Internet](#), CLIC March, April and May 1998 - Nos 22, [23](#) et [24](#) (site consulted September 9, 2007)

This series of three articles describes a multimedia development experiment on the Internet as part of a project subsidized by the *Fonds de l'autoroute de l'information du Québec*. The text explains some of the problems encountered during the creation and the production of interactive multimedia applications on the Internet. The information deals with limits of technical solutions, the lack of scenarios and design difficulties linked to the fact that development and visualisation platforms are in their early stages.

- [Le Web Conferencing décolle](#) (site consulted September 3, 2007)

This article provides information on web conferencing, which is defined as the entire range of Internet tools for video teleconferencing.

- Sally Reynolds, Mathy Vanbuel, Johan Van Heddegem (1997). *Apprendre la visioconférence. Presses universitaires de Louvain : Belgique*

This manual and video clip outlines a training method for video teleconferencing. The manual explains how to prepare for an initial video teleconference.

- Troy Dreier (2004) [Desktop Videoconferencing That's Easy and Secure](#) (site consulted September 3, 2007)

The internet journal, Intranet Journal The Online Resource for Intranet Professionals, describes the video teleconferencing platform.

- [Videoconferencing for learning](#) (site consulted September 3, 2007)

This is an AT&T (American Telephone and Telegraph Corporation) site for teachers and librarians to help them integrate IT into their professional practice.

- [Teacher Hazel Jobe Desktop Videoconferencing : Novelty or Legitimate Teaching Tool ?](#) (site consulted September 3, 2007)

The goal of this site is to help teachers integrate video teleconferencing into their classes. Of particular interest is the section describing the advantages of video teleconferencing.