

Videoconferencing for remote class teaching

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Abstract. The use of videoconferencing for remote class teaching includes not only a simple technology acquisition but also the adaptation of teachers, students and all pedagogical processes involved into the preparation and development of the classes. Unlike other forms of remote class, videoconferencing facilitates classroom teacher-student interaction, but requires a strong adaptation of both parties in this contextual change. This work shows how the use of videoconferencing at the National University of the Northwest of Buenos Aires Province, impacted over the university community and the actions that transformed a technological project into a diary reality.

Keywords: Videoconferencing, Remote Teaching.

Introduction

The National University of the Northwest of Buenos Aires Province (UNNOBA) has two academic sites located in the cities of Junín and Pergamino, geographically distant 88 kilometers from each other. The particularity of this university is its organization in Schools and Departments and the existence of careers that are held at both locations simultaneously. The desertion occurred in some areas of study like agricultural and computer sciences, implies few students taking last years courses at both sites and make it difficult to have a complete teaching staff with the competence required for such a degree of progress. Conventional solution was moving people (teachers or students), spending money and time on travels.

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Purpose of a videoconferencing system

The main purpose of the videoconferencing solution was to have the opportunity to teaching a class at both sites simultaneously and to reduce movement of teachers and students from one site to another. The technological solution should not only eliminate the distances, but also prevent the rejection of change that involves any new technology. The same class, the same time, the same teacher [1].

Technological solution

The first phase of the project involved analysis of existing technologies and the possibilities of implementation at the university. With this goal were investigated different software, hardware and hybrid solutions; adaptation needs of the institutional network and building infrastructure with the associated costs; training requirements and other pedagogical aspects related to the change.

Decisions

The proposed solution should have all the possibilities of teacher-students interaction similar to teaching a class in person. That is, not looking for a solution that limits the teachers in their pedagogical skills, but on the contrary, that may increase. In this sense were discarded non-presential solutions, where the teacher is seen by students but not the reverse. Such videoconferencing solutions, like emission port or virtual classrooms, limit the teacher's space and the students only interact via chat. Visual communication, indispensable in the dictation of a class, does not exist [2][3]. Consequently it was decided to provide full interaction between the two sides adding to the trio voice-data-video, the virtual presence of the teacher and his remote students. In this sense, were diagrammed classrooms having videoconferencing equipment including a mobile camera, fixed and mobile microphones, audio equipment, transmission of data and video simultaneously; an LCD TV for displaying people, a projector for displaying digital content (presentations, documents, etc.), as well as a smart board, technology to provide the teacher all the facilities like a regular classroom. This design of a videoconferencing classroom in contrast to non-presential solutions implies that teachers have both local and remote students and must speech to the whole class and not just to a camera.

Equipment

The variety of solutions on the market influenced the acquisition of equipment. Thus, were received offerings including hardware, software and hybrid solution, with different costs and assembly complexity. The chosen solution was a hardware videoconference system due to the characteristics of compatibility with other equipment, ease of setup and use, and cost-benefit of this solution. In particular were purchased two Sony PCS-1 videoconferencing systems, two 32-inch LCD televisions, two home theater audio systems, two digital projectors and two smart boards. The equipment installation was performed by the solution provider, making a knowledge transfer to technical staff responsible for operations and maintenance [4].

Classroom configuration

The university appointed a classroom in each location to install the equipment. The capacity of the classroom should not exceed 40 people to avoid the loss of interaction needed in this type of solution. At the end of the installation of equipment, both classrooms were prepared to house up to 35 people. The presence of a unique mobile camera implied the need to define "scenes" that included the possibility that the teacher is present locally or remotely. In this sense, the classroom configuration includes not only the equipment (videoconference system, camera, microphones, television display, digital projector, smart board, audio system) but also the teacher and students location (desks and workstations). The main objective was to people (present and remote) feel comfortable, not invaded by the cameras, equipment or cables and can move freely in the classroom. The configuration included the selection of scenes or "presets" available through a remote controller and enabling the remote camera operation (remote scenes). Also were configured as favorite addresses the remote site to test connectivity.



Actual classroom configuration

Classrooms infrastructure

Sound and lighting in classrooms were adapted. In this sense floors and walls were covered with carpet and curtains to absorb sound. Also acoustic ceiling was placed in each classroom. Blackout curtains covered the windows to limit the entry of natural light. Furthermore, the artificial lighting was adapted by dividing the lights into zones for a better view of remote participants and presentations. The presence of electronic devices radiating heat, plus the fact of having to keep the windows closed to prevent the entry of light and sound, led to the need for placement of air conditioners to withstand the heat during spring and summer seasons. Were also carried out electrical work (thermal and shock circuit breakers) to protect both equipment and people.

Connectivity

Connectivity tests required improvements in the capacity of Internet links to the University. In this sense, an expansion of existing Internet connections at both locations was set. Thus, the capacity of Internet links between sited was incremented to 2Mbps. With these improvements, the quality of video conferencing improved dramatically allowing connections up to 768Kbps for videoconferencing between sites, achieving a high quality video, voice and data transfer with minimal packet loss. This connection speed allows multipoint video-conferences with a good quality (384Kbps) up to five sites simultaneously.

Teachers training

A training plan for teachers was designed to strengthen the concepts involved in videoconferencing like interaction, technological and pedagogical issues. This training was intended to be delivered via video-conference with the goal that the teacher can take the place of the student in a remote class. The course about videoconferencing and smart board has been included with others technological courses in the annual training plan of human resources area and is deployed every semester.

Concrete use experiences

During the first semester of use (2nd semester 2009) a small group of teachers from different areas were trained in the use of technology. During each class, we conducted a comprehensive and anonymous survey of experiences from teachers and students that allowed decisions to enhance the experience of both user profiles. The next semester of use, after a new instance of training included new classes in this modality, and for the 2nd semester 2010, the availability of classrooms was low, leading to the need to create two new classrooms for videoconferencing.

The current use of videoconferencing shows some results:

Teacher-student interaction

A critical point is to improve teacher interaction with remote students. Lack of experience in teaching with this modality and the presence of local and remote students; make the remote students not taken into account like local ones. Feeling like watching a video or film rather than participating in a class is the most important risk to avoid the kind of teaching modality, and threatening its reputation and effectiveness as a teaching method. The training plan was intended to be delivered via videoconferencing just so that the teacher can take the place of a remote student. In addition to training were produced a list of tips that included items related to the interaction: "Always remember that there are people in the remote site", "Interact with remote participants, ask them, involve them into class", "Include questions presentation to stop the class and ask remote participant", "Try to achieve dialogue between participants in both sites". These tips were distributed to the teachers involved and exposed on the desks of the classroom as a memory aid for the exhibitor. Finally, during the training gives advice to teachers: you ever have to travel. It is important that some classes are delivered in person to the remote students.

Lesson length

Through surveys and comments rescued in class intervals, it was determined that the length of a videoconferencing class can not exceed three hours and must include at least an interval of five minutes. Regardless of the interaction can be achieved, the duration of the class is a determining factor in the personal appreciation of the videoconferencing by the students.

Personal characteristics of teachers

The mobility of teachers within the classroom and his voice are, on a smaller scale, critical factors. Even with the possibility to manage the remote camera, the classroom corners are places that cameras can not focus. In spite of the sound quality, there were cases of teachers who put their hands in their mouths or speak low his assistants and are not clearly heard by remote participants. These points were also included in the training and tips for improving the student experience, "Place yourself somewhere the camera can take you without moving", "Try to move as little as possible", "Speak clearly, to the middle of the classroom, without touching your face". In extreme cases was required to install a desktop microphone (to replace the environment one) to hear the teacher properly.

Online Presentations

A change of content on the computer, is not instantly displayed on the remote site, it has a minimal delay. Thus a sudden change in screen, a font sizes smaller than 14px, a lack of contrast between letters and backgrounds, scrolling (scroll) text files, a video playback or web browsing, are data contents not well supported in a class by videoconferencing. Were also included tips on these issues, "Design presentations in large letters (at least 14px) and contrast (white background, black letters)", "Avoid the use of dynamic content (videos, navigation, text files), remember that changing the contents of the PC is not displayed instantly on the remote site".

Conclusions

The use of videoconferencing for teaching classes at the National University of the Northwest of Buenos Aires Province has been a highly satisfactory experience and represents a challenge for those involved directly (teachers and students), as well as those involved in maintenance and continuous improvement of technology and service.

To teachers, the challenge of continuous training to use this system as a natural way of teaching. To the students, the challenge of adapting to new technologies. To the technical staff of the university, the challenge of maintaining and constantly improving equipment and technology provided. To the operating staff the challenge of self-evaluation for continuous improvement of service. And the authorities the challenge to promote the service to enrich and enhance the quality of education offered by the institution.

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