Examples and advantages of Continuous Education by means of Videoconference Technologies

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Abstract: The paper presents some examples of continuous education and training of Slovenian teachers that use or teach computer technology in the Slovenian elementary and secondary schools. The underlying research was granted by the Slovenian Ministry of Science, Education and Sport. The first example explains organizational and technological details, problems and advantages of videoconference supported summer schools. The second experience is based on periodic tutorials, scheduled on local TV and accompanied by videoconference supported workshops for the same learning community.

Key words: internet, Lifelong Learning, teacher training, videoconferencing

INTRODUCTION

One of the projects of the Slovenian Ministry of Science and Education is dedicated to computer literacy in Slovenian schools. Part of the project focused on the problems of continuing education for teachers who are required, every year, to participate in various seminars and workshops.

The Faculty of Computer and Information Science, University of Ljubljana plays as a specific role as an educational and R&D institution that follows the trends of the information technologies. It acts as a disseminator of the acquired knowledge to other members of the educational community

and also to the teachers of elementary and secondary schools that should implement computer supported solutions in their everyday activities.

The obvious ways for such dissemination are seminars and workshops that are organized in a classical way with regular presentations in classrooms. In the last years some other more advanced ways of such education were investigated.

Every year the members of the faculty organize on behalf of the Slovenian Ministry of Education so called Summer school for teachers and some selected scholars. This event is mainly dedicated to new Information technologies in education. The participants are mostly Slovenian teachers. The summer school is organized as a workshop consisting of interesting presentations and practical hands-on work in computer supported classrooms.

In the past years the attention was focused into Internet compliant technologies and into the conceptual learning of sciences, supported by these technologies. The participants gained the first experience in using and creating hypertext materials supported by advanced Java, 3D graphics and video examples. The first steps into videoconferencing technology were also accomplished. In the first years the summer school was limited to several tens of participants

In the Year 1999 we introduced a decentralized approach supported by means of ISDN multipoint videoconferencing technology. Eleven different Slovenian cities were interconnected into a single virtual classroom with more than 230 participants following the lectures without travelling to a common location. The basic idea was to interconnect the participating locations to common videoconference lectures given by some experts, and to combine these lectures with accompanied hands-on experience within the computer supported classrooms at each location. The whole system is represented in Figure 1.

The effective interaction between all the participants in the spatially distributed community required several technological and organisational problems have to be solved before and during such events.

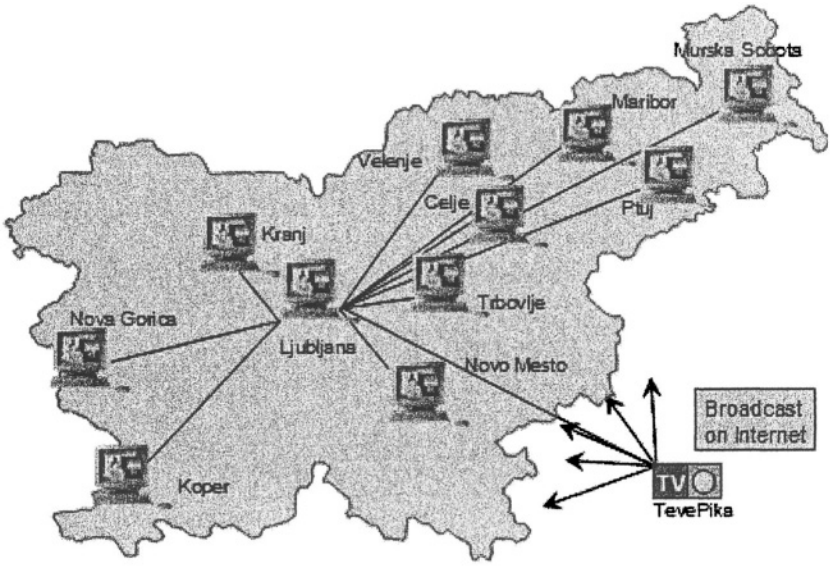

Figure 1. **The interconnected virtual classroom in Slovenia**

TECHNOLOGICAL DETAILS

First of all several computer classrooms in the involved Slovenian schools were equipped with videoconference computers that permitted the interconnection through ISDN. Every videoconference computer was equipped with the particular hardware and software that permitted 2 video inputs and ISDN or IP connection towards the central Multipoint Communication unit (MCU). One video input was connected to the required video camera; the second video input was used for the connection to a presenter's computer (usually a notebook). The multilateral cooperation of these videoconference points was enabled through the multipoint communication unit located in the capital city of Slovenia- Ljubljana. All classrooms were also equipped with multimedia projectors.

A particular attention was paid to the videoconference point at the Faculty of Computer and Information Science which was organized according to its central role. In the first years practically all lectures were given from this point. The lecturers have had the possibility to connect their personal notebooks to the videoconference system by means of appropriate SVGA to video converters. At the time of the first the summer school only

the central location at the faculty had such facility. In the following years every location was equipped with such converters and therefore the lecturing was enabled from other locations according to the scheduled time-table.

The guidelines from more experienced sites suggested involving not more than 4 videoconference points. In our case we decided to connect first 8 and later 11 locations. This represented a risk in the case of the communication problems. Therefore we decided to double the technology with the support of the local TV station. A parallel videoconference point–to-point interconnection with this station was established. The whole event was broadcasted on the local cable TV and also as streaming video on Internet. Such approach gives us the needed backup link in the case of communication problems and enables also an individual follow of the tutorials on domestic computers by means of usual browsers and with Real Player plug-in.

The complexity of the technological infrastructure and the crucial role of the faculty required more staff involved in the support. At each moment at least 4 people were active in the videoconference. Besides the lecturer the second important function was the moderator who supervised the timing of the presentations and monitored the feedback from other sites.

The additional interaction possibilities were achieved by the establishment of an internet portal dedicated to the summer school. The participants had the possibility to send to the lecturers their remarks, questions and links to the accomplished assignments by e-mail.

ORGANISATIONAL DETAILS

The implemented technological infrastructure permitted multipoint collaboration between the involved videoconference points. However, the first experiments lead to the conclusion that a more structured approach should be used. Every lecture had 2 distinct phases: presentation and discussion. In the first phase every lecturer had 40 minutes for his presentation. After that the discussion phase was started and up to 3-4 remote locations had the possibility to ask questions. The technology of multipoint permitted even more active locations but in order to avoid chaotic discussion on one side and too long turnaround the number of interacting videoconference points was limited to 3-4.

From the logistic point of view each videoconference site a local administrator supervised its infrastructure. All administrators were prepared through several preliminary technical videoconference sessions before the official opening of the school. They also received a CD with instructional

materials that permitted them the establishment of the same working environment in their local computer classrooms.

From the organizational point of view one of the problems is immediate, real-time interaction between administrators of the involved videoconference points. In the first year the cellular phones were used for such interaction. In addition to this, in the following summer schools we established a parallel communication system that was used by videoconference administrators but it was transparent to the regular participants. We implemented classical simple internet chat between the administrators. They had in such a way the possibility of immediate reports concerning the technological problems (mostly with bad sound).

In order to give to the participants the feeling of a well organized school a Web portal was established with all data concerning the organization of the school and links to instructional materials.

A particular care was paid to the quality of presentation materials since the quality of streamed video image requires bright and large fonts on possibly dark background. Unfortunately not all lectures followed the prepared PowerPoint templates and guidelines.

Considering the problem of the possible communication failure some lectures were prepared in advance with the technology of interactive video on demand. In such a way a complete tutorial dedicated to the 3D graphics was prepared. Typically each lecture was composed by a PowerPoint presentation with various video clips and combined by lecturer's talk and video. The characteristics of such lectures are that they are much more intensive and personalized since each participant can stop, step back, and skip parts of the interactive streamed materials according to his own previous experience and knowledge. The advantage of such tutorials is also high resolution of presentations, much better than with videoconferencing, combined with video clips. However, according to the guidelines, each lecture should be no longer than 10-15 minutes.

Remarks were that this technology can act as a complement to the regular lectures but it cannot be a good substitution for live presentations because there is missing immediate live feedback from the instructor's side.

ENGAGEMENT OF THE PARTICIPANTS

The participants had the possibility to follow the videoconference lectures and to put the questions to the instructor in various ways:

– Giving the questions by regular e-mail. In fact the moderator located near the lecturer continuously monitored the incoming e-mail and forwarded it

to the lecturer. The lecturer could decide to answer immediately or to postpone the answer after his presentation.

- Asking for attention: The moderator annotated the requests for questions and enabled the connection with the corresponding remote locations immediately after the presentation.

Part of the participants' activities was the accomplishment of their individual assignments. At the beginning of the summer school every participant received a CD with the corresponding courseware. The contents mainly consisted of the additional didactic stuff and some software tools that were required to solve the assignments. They were able to do this in the local computer equipped classrooms and had the support given by local administrators. Besides this they were motivated to ask some additional questions to the experts by means of regular e-mail. The experts had also the possibility to see and assess the assignments accomplished by the individual participants.

For this purpose, each involved location established a local Web page, which was linked to the central portal of the school. The basic idea of these local Web pages was decentralized broadcasting of the solutions of the domestic assignments, prepared by the participants.

At the end of the every summer school the expectations and the reality of this event were analyzed and suggestions for further improvement were given. The best solutions of the assignments, prepared by the participants were also presented by means of the videoconference.

ANALYSIS AND REMARKS

After the first summer school one of the observations was that there were too many lectures (one week, at least 5 hours per day) and the participants did not have enough time for their assignments. But such intensity of videoconference lecturing was also problematic from the lecturers' and organisational point of view. We concluded that in the future we should limit the lecturing to 3, in any case not more than 4 hours per day and give more time to hands-on experience.

One conclusion of this event was also that the technological infrastructure was too complex. One reason was also doubling of the communication technology. In fact more than 30 people worked in the background of the summer school. We concluded that it should be simplified. However a communication backup is needed in any case because of the possible communication problems and of the large number of participants, dispersed in different cities. In the worst case the local

administrators should be able to activate some substituting activities in the local classrooms.

Another remark was that only the central point (faculty) had the possibility of giving lectures accompanied with didactic materials from personal computers (notebooks). According to this observation now all videoconference sites are equipped with converters which permit the connection of a separate teacher's computer to the videoconference computer.

Another conclusion was that the multipoint concept is maybe attractive with its interaction possibilities but is not adequate since it could lead to chaotic problems because of too many locations involved. In any case the experience show that the lectures should not be interrupted at any moment and it was better to give to participants the permission for questions only on request, approved by the conference moderator. This means that instead of multipoint is better to use multicast or sometimes even broadcast concept.

Certainly the success of the summer school was represented by the involvement of more than 230 participants from different cities without the need of their travel and accommodation. Despite the distance between them they really acted as a virtual classroom. The technology also permitted the remote involvement of experts without the need of their travel to the central location.

EXPERIENCE WITH CONTINUING DISTANCE LEARNING

The learning community participating in the experimental phase of summer school consisted of secondary and elementary school teachers who should get or refresh their basic knowledge of computer literacy and multimedia technologies. In the teaching and learning process several experienced teachers of computer engineering were included. At least one such teacher was present at each location. Their role was to help their colleagues on particular sites during the practical hands on workshops that followed the lectures.

The success of the first videoconference summer school encouraged the involved partners to activate one experimental school organized on distance learning concepts. Instead of a single, one-week long seminar, the planned school had to last several months and had to be more focused on particular topics. The idea was to try a new concept of continuing distance learning. The already mentioned communication technologies were used for distance lecturing and for additional explanations during the additionally introduced

domestic assignments. The first experimental course was dedicated to the Java programming language.

In order to permit better interaction and to give more time for domestic assignments the following didactic scenario was used, with the lectures limited to 30 minutes per week and broadcast through the local cable TV and the Internet. The broadcast of each lecture was repeated 3 times, once in the afternoon and 2 times in the late evening.

Again, a Web portal was dedicated to the experimental school, which contained links to the tutorial used during the lecturing, with some links pointed to the additional didactic materials. The "Program" page contained the structure and schedule of the course. The "Videoconference points" page contained useful contact information concerning all involved locations (e-mail addresses of local administrators, links to local Web servers). The "Assignment" page was dynamically updated every week, with the definition of the particular exercises for the participants and, with the delay interval of 1 week, the possible solutions of these exercises. The "Didactic materials" page contained the link to the hypertext lessons used by the lecturer, links to some interesting Web pages on Internet and links to some useful downloadable software tools.

Once per month a virtual, Videoconference supported workshop was organized when the participants obtained a new assignment that integrated the already acquired knowledge, and providing an opportunity when they could also ask the lecturer for any additional information. The basic idea was again that they could use the computer facilities at their classrooms during such workshop and share their experience between them. In addition they could interact with lecturer by means of usual Internet services.

In order to permit as much as possible the same working conditions for all participants regardless of their location a separate working meeting of all local administrators and the lecturer was organized before each Videoconference workshop. All administrators obtained a CD with instructors' didactic material enabling them to prepare each local computer classroom with the same didactic tools. This approach also permitted them to act locally in the case of communication problems.

A separate CD was prepared for each registered participant. This CD contained the hypertext lessons which were used by the lecturer during his performance. The CD contained also some accompanying useful didactic material.

CONCLUSIONS

Both experiments, the first videoconference supported summer school and the experimental introduction of continuing education supported by communication technologies had some common characteristics. First of all the behaviour of the participants is just to follow the lectures and not to use the combined videoconferencing and Internet communication technologies for immediate feedback with the lecturer. Therefore such lectures had more broadcasting than interacting character. The participants preferred to interact with the teacher in the days following such lecture by means of usual Internet services, mostly e-mail. Most of the participants also preferred to work on their assignments alone at home and to interact with the lecturer after, and not during the periodic videoconference.

Another interesting experience was using the public services of the local TV station. The limit of 30 minutes per lecture opens for the lecturer new challenges because their explanation should be more efficient, compact and at the same time attractive because it is usually followed also by some less experienced listeners. This is even more difficult in the case that the lectures are "on line" and no corrections are possible as this is the case of "playback". From the technological point of view practically all didactic materials had to be adapted considering the guidelines how to use colours and fonts (big and simple fonts, bright and cold colours on black background) in order to guarantee a better readability on TV.

One of the side effects of such lecturing are well prepared didactic materials which are recorded and can be published on video-servers for repeated training seminars.

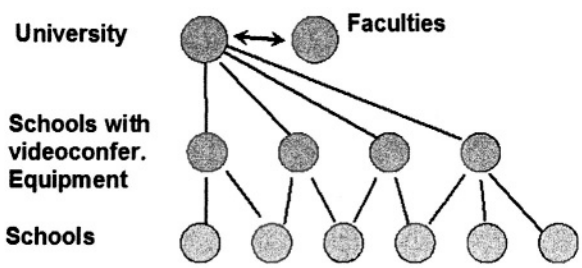

Figure 2. Model of the learning community

Another positive side effect of this experience was the increased link and communication between participating teachers and professors and other

experts at the university. The personal communication between participants and university lecturers often continues also after such events. In fact we obtained the model of the learning community represented on the figure 2. At the top of this community are involved faculties, on the second level are the schools equipped with videoconference technology whose personnel can also act as co-organizers and multipliers in the case of repeated seminars and workshops. On the third level are the elementary and secondary school teachers from various schools, interested in the continuous refinement of their knowledge and skills.

The videoconferencing technology also influenced the participating schools in such a way that they use the same technological infrastructure in some informal contacts between themselves. It is also planned that such videoconference systems will be installed in the buildings of Slovenian Ministry of education and that it will be used in the case of its periodic interaction with the directors of the elementary and secondary schools.

The achieved experience and the following analysis lead to the conclusion that this kind of education should remain traditional. One of the primary reasons is that the participants do not have to spend money and time for travelling. In fact they can join one of the nearest videoconference points which are established overall the country on the basis of the regional level. This approach is also appropriate for short lectures or presentations lasting just a couple of hours. This is particular useful for knowledge-refreshment seminars that are a never ending story in the field of information and communication technologies and their application. In the near future this type of education will continue with periodic videoconference seminars accompanied with hands on workshops. Further development of this activity will be in a more structured and focused organization of videoconference based seminars which should consider the preliminary knowledge of the involved participants and their personal skills and interest.

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