

VOCATIONAL EDUCATION AND TRAINING BY MEANS OF INNOVATIVE TOOLS AND MODELS

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Abstract: This paper presents some achievements of the project entitled „Innovative Tools and models for Vocational Education and Training in Central and Western Romania” (MoVE-IT) financed by EEA financial mechanism. It has the priority to develop human resource through promotion of education and training, by means of distance learning. The contraction of the vocational training network, the use of blended learning and the construction of videoconferencing infrastructure are presented.

1. INTRODUCTION

The European Commission has recently approved an innovative project that is going to develop and establish a regional network of vocational education and training centers in Central and Western parts of Romania [1], by transferring knowledge, good practices and state of the art advanced video communication solutions from Norway. The results will improve the inter-institutional partnership between existing vocational training centers and the “Petru Maior” University of Targu-Mures, by stimulating and improving the quality, accessibility and supply of vocational education and training services for further development of human resources.

The objective is to renovate the teaching infrastructure used by specialists in vocational education, and improve vocational training quality by providing more flexible trainings paths to the Romanian labor market.

2. THE VOCATIONAL TRAINING NETWORK

A high definition video network is constructed in the Central and Western parts of Romania, and organizations in 4 different towns may utilize the infrastructure to provide vocational education and training within the year 2011. The European EEA Program has recently approved this project. During the first phase, “Petru Maior” University of Targu-Mures (UPM), will be the hub in the video network. It is an innovative project that aims to develop and establish a regional network of vocational education and training centres in Central and Western parts of Romania [1], by transferring knowledge, good practices and state of the art advanced video communication solutions from Sør-Trøndelag University College in Trondheim, Norway. The results are going to improve the inter-institutional partnership between existing vocational training centres and UPM in the Targu-Mures region in Central Romania, by stimulating and improving the quality, accessibility and supply of vocational education and training services for further development of human resources [2].

The main components in the video infrastructure include: Professional HD videoconferencing systems with cameras, microphones, Smartboard with projector, additional projector, monitors, CD and DVD players, document camera, connection panels for PC, laptop, steering system with pressure sensitive touch screen, microphone systems for detection of various types of sound, and loudspeakers. The video network is containing the following main components:

- A high standard dedicated video room at UPM, for delivery and distribution of vocational training to external partner sites by use of two-way videoconferencing and digital blackboards,

- Video rooms at 3 different vocational schools in the region that is dedicated to receiving training from UPM or another organization that utilizes video in training,
- Construction of at least one digital classroom, as well as two state of the art computer laboratories at UPM. The state of the art digital classroom infrastructure, include transfer of required knowledge transfer and the practical organization of training delivery,
- Design and establishment of a state of the art vocational education and training infrastructure based up on best video practices from Scandinavia,
- Development and deployment of instructor training through a dedicated instructor training program,
- Delivery of vocational training courses that may utilize blended learning methods mixing (i) on-site training, (ii) inclusion of learning management systems, (iii) deployment of streaming video solutions, and (iv) effective use of videoconferencing, into distance learning environments.

The vocational schools are located in the towns Oradea (Agora University), Alba Iulia (1 Decembrie 1918 University) and Sighisoara (Mircea Eliade National College). The distances from the hub ("Petru Maior" University of Targu-Mures) and to the sites are from 60 - 225 km. The plan is to teach at least 1200 students and provide instructor training to at least 30 instructors within 2011.

3. BLENDED LEARNING

The validation of the infrastructure will be done by delivering a number of vocational educations and training courses. This will enable UPM and the vocational schools to offer and validate state of the art vocational education and e-learning adapted training to staff from industry in Central and Western parts of Romania. The objective is to renovate the teaching infrastructure used by specialists in vocational education, and improve vocational training quality by providing more flexible trainings paths to the Romanian labour market by inclusion of e-learning methodologies. Blended learning solutions constitute of the following training elements:

- Traditional classroom structured instruction with face-to-face training where the trainer(s) and the students meet when the course starts. Digital blackboards are often used,
- Self-paced learning through Learning Management Systems (LMS),
- Hands-on practical training and collaborative laboratory work,
- Inclusion of video streaming and videoconferencing services that offer high quality multipoint two-way real time communication to groups of students.

Multilingual instructor training courses help: a) simplifying introduction to training delivery that utilize video communication, b) pedagogical methods and use of video in vocational education and training [3,4], c) blended learning methods that optimize use of video [5]. The later includes basic understandings on how to plan, deliver and perform vocational educational programs by use of video in a blended learning context, as well as optimizing the experienced quality of the lectures from the instructor and students point of view. The training will consist of a combination of theoretical and practical tasks in class, and with mentoring and guidance of the instructors/teacher that may follow it up by utilizing videoconferencing.

4. CONSTRUCTING THE VIDEOCONFERENCING INFRASTRUCTURE

Traditional classroom based training offers an environment that yields easily access to eye contact between the teacher and students. Eye contact is indeed one of the critical issues when establishing a vivid visual communication and collaboration arena dedicated for distance learning purposes. Such an arena has some key features [6]:

- It has equipment for distribution of the PC screen as a video signal (or as a parallel data stream) in real time, if necessary through firewalls.
- It is possible to monitor adaptation and selection of proper presentation surface areas within the digital classrooms.
- Proper orientation and location of monitors, digital blackboards and camera(s).
- Additional microphones, buttons for camera tracking, sound detection, etc.
- Inclusion of steering systems.

Eye contact affects our engagement and attention towards the teacher and the subject thought. Digital classrooms must be designed to satisfy the needs of establishing eye contact between the teacher and small end-user groups (1-5 persons), medium sized end-user groups (6-15 persons) and larger end-user groups. The degree of eye contact is dependent of several factors like the physical shape of the room, the distance from the camera(s) to the teacher and the learners present in the same room as the teacher, the background behind the teacher (a digital blackboard or an ordinary wall), the size of the monitored video picture(s) as regards the teacher or the students, the number of remote endpoints, the size the group, etc.

This configuration yields the instructor access to a time efficient training environment where it is easy to scan and import a picture into the digital blackboard, e.g. from a text book at the document camera within a period of 3-5 seconds. High quality video mediated training requires much more variation of pedagogical methods, and easy inclusion of various tools and services offering balanced use of various presentation modes and presentation techniques. The learning environments include using different digital and non-digital learning sources that could be easily interchanged, varied and recorded. Effective use of balanced presentation modes, which are as important as eye contact, require that the teacher actively uses various communication and collaboration technologies, select various positions for the camera, as well as changing the size of the camera picture. This includes everything from talking towards various cameras with subsequent monitors, to inclusion of various types of additional equipment.

If a teacher selects to use the digital blackboard actively, the infrastructure in the digital classroom must be designed in such a way that the digital blackboard may store freeze frame pictures of the presentations made on the blackboard or the document camera. Just after a lesson is completed, may the information be published online as a PDF-file. Such a solution is attractive for the students that instead of making up handwritten notes may focus their attention towards understanding the curriculum thought.

Digital classrooms will have various user areas. It is important to remember that inclusion of both front and rear projected digital blackboards cause some technical challenges. The main problem is that the video camera tries to record a surface that receives a lot of light from the video projector, and thus want to maximize the light in the room. The end-users that are actually sitting in the digital classroom prefer to reduce the light in the room in order to increase the contrast with respect to the surface of the digital blackboard, i.e. to make up an arena where it is easier for them to read what is written on the digital blackboard. To locate a camera in such a way that it records a video of both the teacher and the digital blackboard will usually yield lower technical quality on the video picture unless additional light sources are introduced. Manual adaptation of the light sensitivity of the video camera may also be a convenient solution, though this may cause

challenges towards effective use of an external steering system and the professional skills of the teachers. Due to this we usually (as far as possible) avoid using the rear camera to track any facial expression of the teacher when he is teaching from the digital blackboard. The rear camera usually works best if it records a picture of the teacher when he is positioned in front of an ordinary wall, i.e. just beside the digital blackboard.

Digital classrooms must be designed in such a way that all types of students and learners could use them. This includes a range of activities covering everything from “process oriented teaching” where the discussion between teacher - student or student - student constitute the main topics, to “product and method oriented teaching” where it is one correct answer. Thus, the audio-video infrastructure should be designed in a flexible way offering all user groups (i.e. teachers and students) the possibility of selecting which equipment to use according to their needs. A physics teacher will most probably use digital blackboards extensively and complete many pages with handwritten material during a teaching period, while other teachers that teach other subjects only may write some remarks on them, or avoid using them at all as the document camera may fits their needs. On top of that, we need to consider the various sizes of the student groups that are going to use the digital classrooms, by selecting equipment and furniture’s offering them highly flexible solutions.

5. DISCUSSION

The teaching infrastructure is renovated in Central and Western part of Romania in order to improve and enhance working conditions for providers of vocational education. It improves vocational training quality by making it more flexible and adaptable to the Romanian labour market. The validation of the infrastructure will be done by delivering a number of vocational educations and training courses. The presentation will demonstrate the first results obtained from the ongoing R&D work for the development of a regional network of vocational education and training centres in Central and Western Romania. The network will utilize high definition video solutions and the new SRS technologies, to improve the inter-institutional partnership between existing vocational training centres and a regional university in the central part of Romania. Transfer of best practices and knowledge from state of the art use of video in education in Norway is addressed. Participating training organizations and industrial companies may use the new training environment to offer and receive a broad range of specialized courses, including transnational exchange of competence transfer.

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