Digital Video Interaction to enhance traditional teaching

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Abstract: Italian students, like their counterparts worldwide, prefer to spend time on innovative technological features rather than learning traditional subjects studying on textbooks. All this is evidenced by the growth of devices such as mobile phones, MP3, iPOD and socialization environments such as YouTube, LinkedIn and Facebook. In Italian high schools and universities, research indicates that the students are losing their international ranking, i.e. examination scores are decreasing, yet the Government funding on education has not been improved. This paper reports on an active role played by students in the Digital Communication degree at the School of Sciences of the University of Milan, Italy, to develop e-learning support, both across their university curriculum and in the high schools. This support includes creating and maintaining portal websites, discussion forums, developing and exchanging tailor-made learning objects, including an interactive video-journal accessible on mobile phones and WEB-TV. These developments are integrated into the learning process through a teaching methodology with enhanced outcomes when compared with traditional classroom learning (based on end-of-year examinations and testing). This research blends technology led by the University LCAD Research Laboratory, with teaching support provided by specialists in local schools and the University, plus students and their parents (all of whom often have had, in the past, to pay for private tuition prior to examinations). Positive outcomes from these innovative and integrated approach are monitored during this scholastic year following initial successful tests already experienced.

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1. Introduction

This innovative e-learning project started a decade ago with the aim to develop a fully functional framework using the Internet, to support interaction between students and professors and distance learning for students who could not attend regular lessons. This framework, known as the Didattica Webcentrica Project (Web-based Learning Aid, www.webcen.unimi.it) still supplements teaching in the Computer Science curricula at the University of Milan [1], as described in [2]. The Didattica Webcentrica [3] Project allowed us to address specific issues:

- each student has a educational support that reflects their background knowledge and links this with the requirements of the degree class.
- providing learning materials and experiences for those students who cannot regularly attend lectures in classrooms. These barriers include work commitments, commuting difficulties, especially for those students with a lack of local or private transport.
- enhancing higher ICT practice among students, while helping them to obtain better grades.

This paper investigates video-based interaction as a tool designed to:

- enrich the educational process, building on the wide availability of communication equipment such as mobile phones, MP3, and iPod;
- reduce “blackboard” dependency by fully utilizing familiar technologies including educational videos on a laptop or top-level mobile telephones;
- stress the active role played by students, through their familiarity with documenting events using digital video-recordings. These could be made public by uploading to video hosting portals such as YouTube or contributing articles to magazines/journals promoted by their high schools or universities under a professor’s supervision.

The analysis of these new approaches were first described at their initial stage in our paper at the World Conference on Educational Multimedia, Hypermedia and Telecommunications 2008, in Vienna, Austria, on June 30-July 4, 2008 [4]. This encouraged us to explore other means to improve the efficiency of the learning practices and to enlarge the target audience.

Interactive VideoJournal, content management and metadata, or experiments with students as class-work assignments, have all enabled teachers and students to investigate business models, especially in the current adverse economic climate.

The focus of VideoJournal on high school students has two motivations:

- to involve them in an entertaining learning process, with topics that are related to their lifestyle and preferences;
- to get them closer to the university environment, through cooperation with university students.

Recent research has highlighted that, students’ grades in the high schools of the Lombardy Region had an average of 60 percent of sufficient marks in the first semester (January 2008), with major difficulties reported particularly in scientific disciplines such as Mathematics and Physics. A recent E.C. study, comparing 40 nations, ranked the performance of the Italian high schools at 37th position, but the
Italian State is in first position in terms of the financial investment in education. It is clear therefore that there is an urgent need to improve the learning experience – and hence the performance outcomes of Italian students.

The University of Milan is the third largest university in Italy, with a student population of around 75,000, which grew steadily in the last decade. Our Faculty of Mathematics, Physics, and Natural Sciences is the fourth largest faculty of the University, after the faculties of Medicine, Literature, and Political Sciences. Finding a way to enhance the “quality” of new students has become a top priority. In Italy, no University refuses new students, since the main component of the state’s financial support to them is based on the number of enrolled students.

The next paragraphs of this paper will address: the VideoJournal project and VGG (the Interactive VideoGiornaleGiovanile), the experiments with the students at the Law School through the VG Servizi Giuridici project, the VG Learning environment, content data and metadata management, and Pesce d’Aprile Jokes.

2. The VideoJournal project

The Osservatorio Permanente Giovani Editori, a branch of the FIEG Italian Federation of Newspaper Editors, operates since 1997 a Giornale in Classe Project, www.osservatorionline.it, where a copy of an influential nation-wide newspaper, together with a copy of the leading local newspaper, are read in the high schools’ classrooms for stimulating a debate, supervised by a teacher, on specific articles. It is a very successful project, involving over 1.5 million high school students in 2007. Financial support comes from bank foundations, including their major shareholders, while newspapers provide press coverage and the journalists their free time to give support and feedback.

It is also widespread practice in high schools to promote school journals, usually a once-a-year publication, due to difficulties in funding. Since it is not allowed to use the Ministry of Education’s public funds, expenses must be covered by external sponsorship, or by the students themselves.

In this scenario, the VideoJournal project represents a different approach, giving opportunities to reduce production expenses for schools, while promoting the students’ engagement as authors. The project was launched in May 2007, initially as an extension of the AffarItalianiNEWS Laboratory handout, developed within the Masters Course on Interactive Digital Television, www.masteriDTV.unimi.it, in the 2006. It introduced an innovative newspaper format using video-based media files specifically designed for the small screens of mobile phones, instead of the standard format of a news website on a large PC screen, as in the internet journal AFFARIITALIANI, www.affaritaliani.it.

The adopted viewing technology is based on the TV over Internet model, a platform that’s widely used in Italy by several banks and by the Chamber of Commerce in Milan in the information service www.impresalive.tv provided as a
WEB TV, or by the private TV ventures like Televisionet, www.televisionet.tv, founded in Spring 2006 where many of our students currently cooperate.

The interactive VideoJournal is a fusion of all the above techniques, while reversing the Giornale in Classe roles played by the students, who act as:
- a journalist, as they conceive documented information with a video camera;
- a video and audio IT-professional, during the editing of the videos with programs like Final Cut and Adobe Premiere;
- an editorial professional, by adding photos and other audio/video files.

Students manage the video articles by themselves, completing it with the Author Name – Title – Subtitle and Flyleaf to be added on the VideoJournal homepage; with quite important immediate outcomes:
- Authors are the students themselves,
- There is a strong potential to promote topics suited for the interests of people
- There is a de facto promotion of modern digital communication practices over a large base of users
- Authors cooperate with the Director of each school’s VideoJournal and their editorial staff, where students’ parents are also welcome
- There are no column or page limits, space is digitally unlimited
- Availability is immediate, physical access depends on mobile telephone contracts and home internet connectivity to providers
- Power consumption is kept to a minimum, as is paper and ink waste. Furthermore, there are no vehicles used for distribution. This programme has strong Green Credentials
- No need for an enhanced budget – costs are minimal while the students’ intellectual skills become the asset value
- Coverage has no geographical boundary, being limited with the users’ ability to understand the language that’s spoken in the audio, while videos have a potential for being widely understood.

3. VGG: the Interactive VideoGiornale Giovanile

The VGG (Video Giornale Giovanile) (Fig. 1-2) focuses primarily on the Internet, allowing it to exploit all available communication possibilities on the World Wide Web that provide immediate one-to-one and many-to-many interaction. Alongside the single photographic image selected to appear on the VGG homepage for each video article, there are also two buttons that give additional possibilities:
- a letter icon, at bottom left, enabling e-mail to be sent to the addresses that are linked to specific video article, thus allowing a personalized response to the reader and further personalized continuing communication and feedback;
- a printer icon allows the printing of a one-page summary of the topic which the author intended to cover with that video article.
4. Content Management and Metadata

To allow easy, quick and verifiable competencies required in the upgrading of the VGG from a single reading event to a repository of information, the Content Management is handled by extracting metadata from the Author Name – Title – Subtitle and Flyleaf attributes of each video article. This process has been designed following an approach similar to metadata and tags in the Learning Objects methodology into an E-Learning Management System [5]. This feature allows the retrieval of topics over a growing number of different subjects, as the VideoJournal practice will become more widespread. This paper can only summarize our approach to these information management techniques.

5. The experiments with students

To gain experience with students not specifically involved in the Computer Science Curriculum at the University of Milan, we carried out a class-work assignment for senior-year students at the Law School, the VG Servizi Giuridici.

5.1 VG Servizi Giuridici

The aim was to teach video production and post-production techniques to students who had no previous educational background or experience in this field. Therefore, the fundamentals of shooting video films (shots, lighting, framing, etc.) and editing, through the use of computer programs such as Final Cut and Adobe Premiere, were taught before launching the project.
The outcome is partially available at http://video.dsi.unimi.it, while at http://vgg.dsi.unimi.it/servizigiuridici you can find the projects submitted by the students on January 14, 2009.

No restrictions were imposed regarding the subject of the videos to be made; in fact the students, some of them shy, were encouraged to choose the subjects of their personal interests. The liberty of choice regarding the subject of the videos yielded extremely positive results, as most of the students produced films about their hobbies and favourite activities such as volleyball, cooking, travel, etc.

The students were also instructed on how to upload their videos to the VGG website and edit their stories with a professional news format. These stories were later made available on the World Wide Web for practically anyone surfing the internet to see them.

5.2 Pesce d’Aprile Jokes

A similar approach has been taken with the freshmen participating in the Fundamentals of Digital Communication class of the B.S. program in Digital Communication at the School of Mathematics, Physics, and Natural Sciences in the Second Semester of the 2007/08 Academic Year. In this experiment, to make the assignment more entertaining, it was proposed with the theme of Pesce d’Aprile (April Fool’s Day). The students were asked to create Pesce d’Aprile jokes, and then shoot videos of them using cell phone cameras. The videos were later edited with computer programs for post-production, and uploaded to our video-hosting system. In order to manage the videos, a video-hosting platform with intermediate characteristics (between amateur and professional levels) and automated systems of audio/video archiving, conversion and publication was used. Once installed, this system guarantees an entirely personalized service without the necessity of paying any license fees. The Pesce d’Aprile videos created by the students can be viewed at the link http://vgg.dsi.unimi.it/pescediaprile/.

5.3 VG Learning

The following student exercise provided the creation of supportive videos for the didactics within classrooms in high schools. Such videos were produced in collaboration with the teachers and students of the fourth and fifth years. They were created as auxiliary support for students facing difficulties and barriers. These included poor grades, focusing on certain topics of particular significance for the fields related to Computer Science. In this phase, certain advantages related to the launch of a process of collaborative learning emerged. Students on the course of Interazione Uomo-Macchina have put into practice the theory learned during the lessons; applying them on themes related to these studies. On the other hand, the students have found a support for their studies, particularly in line with
their own needs of learning, experimenting in first person the qualities and the
type of competencies that are acquirable at university level. Furthermore,
apprenticeships were offered by the Department of Information Sciences, for
students who graduated from high schools. A period of time has been dedicated to
collecting information regarding the necessities expressed by the high school
teachers. In a second phase, student groups will be assigned spaces on
VideoJournal. Each group will use their combined skills and experience to collect
relevant information, linked to specific courses of recovery or support for the
study of one or more classes. Within such areas, didactic video materials produced
in collaboration with university tutors and high school teachers will be available.
Complimentary activities will be related to the management of the spaces of
interaction, with the participation of diverse subjects involved in the project.
University students will undertake the duties of tutor and moderator by utilizing
these instruments of collaborative learning.

The current phase of the project creates video resources by/for teachers and
students in both universities and secondary schools, either for explaining content
and learning paths, or for the use and sharing of materials. The first phase of the
experimentation, consisting of the cooperation between the students of the
University course in Fundamentals of Digital Communication and the teachers
and senior students of the high schools, enabled the design of a route map and
common contents for experiences and materials. Tutors and students were able
to create videos on basic mathematics, physics and information technologies, with
the cooperation of university teachers.

There can be many advantages to be drawn:
- Solving some problems in the relationship between the university-level
didactics and those of the secondary schools;
- Contributing to the improvement of competencies in scientific matters;
- Diffusion of technical competencies and knowledge presentation using the
  VideoJournal;
- More information regarding the University’s didactic offerings, thanks to a
  better visibility of the specific contents of the University courses.

6. Similar projects and developments elsewhere in the world

Similar projects have been undertaken by numerous universities throughout the
world, such as the International BBS and Internet Video Conferencing between
Universities [6] project of the Dokkyo University in Japan, which aims to develop
a collaborative learning project using Internet video technologies. The project
allowed the students to collaborate with the students of the University of Illinois in
the United States through the use of a database of video files as well as live online
video conferencing and e-learning applications. Similarly, the Nagaoka University
of Technology in Japan developed the Webcam-Based Knowledge Management
Giorgio Valle, Francesco Epifania

System for Special Needs Education [7] project in order to create a powerful system that archives teaching strategies and solutions for dealing with student-related issues in the classroom. The project permits the sharing of information among widely dispersed schools and other educational institutions, and supports the collaborative development of effective teaching plans.

7. Conclusions and future developments: Financial sustainability

Digital Video Interaction has been shown to be an effective complement to traditional classroom-based learning as it stimulates an active role in the learner, while stressing those communication abilities that are most valuable when seeking employment. We will strongly support the current phase of the VG Learning project characterized by the creation of a repository of educational resources for high-school students, with insufficient grades, in order to minimize the need for private tuition. We also see a possible role for Digital Communication students as private instructors in the high schools from which they have graduated, with the implicit benefit of reusing VideoJournal style tutorials and lectures as a source of additional income for the students.

References

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