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THE ROLE OF FUTURE GENERATION HYBRID TV TECHNOLOGIES IN EDUCATION

ULOGA NOVIH GENERACIJA HIBRIDNIH TV TEHNOLOGIJA U OBRAZOVANJU

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Abstract

In this paper, is carried out systematic information and communication analysis of role of implementing hybrid television technologies in the process of e-education technology, which is possible because of technological future of new TV generation. The authors suggest that the development of new television technologies is in constant communication progress and it is correlated with technological changes (transition from black and white to color, the introduction of stereo / surround sound, and the possibility of new high-resolution image technology which is offered by new generation television receivers and video on demand) that in the technological and communicational terms have not yet been completed. At the present stage of technological and media development of the global world, more than 400 million citizens have direct access to the Internet with a broadband Internet connection (10 Mbps to 100 Mbps), which allows to citizens delivering of media content in high-tech resolution (720p or 1080p). For these reasons, traditional television "providers" respond to the challenges of hybrid television technology with new development and investment deals. Today the media "providers" in education are developing new customer services and media services for the provision and delivery of the new educational video content via Internet Protocol (IP technology) as well as other videos ("tablet") which are mounted on mobile devices of the citizens. Providers of educational media

Sažetak

U radu se provodi sustavna informacijska i komunikacijska analiza uloge implementacijskih hibridnih televizijskih tehnologija u procesu E-obrazovanja koje nam omogućuje tehnološka budućnost nove TV-generacije. Autori ukazuju kako je razvoj novih televizijskih tehnologija u stalnom komunikacijskom napretku i korelaciji s tehnološkim promijenama (prijelaz iz crno bijele boje u kolor, uvođenje stereo / surround zvuka, te nove mogućnosti visoke tehnološke razlučivosti slike koje nam pružaju nove generacije televizijskih prijemnika i videa na zahtjev) koje u tehnološkom i komunikološkom smislu još nisu završene. Na današnjem stupnju tehnološkog i medijskog razvoja globalnog svijeta, više od 400 milijuna građana ima direktan pristup Internetu s širokopojasnom internetskom vezom (od 10 Mbps i do 100 Mbps) koja omogućuje građanima isporuku medijskih sadržaja visoke tehnološke rezolucije (od 720p ili 1080p). Iz tih razloga tradicionalni televizijski »provideri« reagiraju na izazove hibridnih televizijskih tehnologija s novim razvojnim investicijama i ponudama. Danas medijski »provideri« u području obrazovanja razvijaju nove korisničke usluge i medijske servise za pružanje i dostavljanje građanima novih obrazovnih video sadržaje putem internetskih protokola (IP tehnologije) kao i drugih videa (»tableta«) koji su ugrađeni na mobilnim uređajima građana. Pružatelji obrazovnih medijskih sadržaja (»high-definition obrazovni sadržaji«) su pred

("high-definition educational contents") are in the front of new communicational, educational and technological challenges. The authors, based on the set of theoretical assumptions and empirical research about the place and role of hybrid technology in a new generation of TV in E-education, give a scientific formulation of implementing new features and models of education that are provided by a new hybrid television technology through a new generation of television receivers. In conclusion, on the basis of the genetic-structural and functional analysis of the convergence of media, the authors explicate the historical value of television technology and propose new educational opportunities (video on demand) which provide a hybrid television technology with unlimited social, hardware and software and technological values and communication capabilities of the new generation TV in the future of E-education.

novim komunikološkim, tehnološkim i obrazovnim izazovima. Autori u radu, na temelju postavljenih teorijskih postavki te provedenih empirijskih istraživanja o mjestu i ulozi hibridnih tehnologija nove TV generacije u E-obrazovanju, znanstveno formuliraju nove implementacijske mogućnosti i modele obrazovanja koje nam pružaju nove hibridne televizijske tehnologije putem televizijskih prijemnika nove generacije. U zaključku, na temelju provedene genetsko-strukturalne i funkcionalne konvergentne medijske analize, autori ekspliciraju povijesne vrijednosti televizijskih tehnologija te predlažu nove obrazovne mogućnosti (videa na zahtjev) koje nam pružaju hibridne televizijske tehnologije s neograničenim društvenim, hardwerskom, softwerskim i tehnološkim vrijednosnim komunikacijskim mogućnostima nove TV generacije u budućnosti E- obrazovanja.

1. Introduction

Over the past 20 years, the experiences of television have changed enormously. When broadcasters started to transmit a programme it used to be normal that everybody watched the same shows, on the same channels, on the same devices, in the same rooms, and at the same time. Today, with the exception of appointment TV, it's almost a challenge to find other people watching the same programmes as you. More likely, the majority are watching TV randomly. This includes simply channel-surfing, browsing the on-demand options or searching for recorded programme. In view of the new features, such as smart TV, a return to the deliberate watching of TV (″I will watch this and this tonight at 8'o clock″) is at this time almost impossible. Most viewers are sitting in front of a TV but using in parallel another piece of electronics (etc. Laptops, Table PC's, Smart Phones), which significantly reduce the attention towards TV programmes /**1**/. Another stumbling block against carefully viewing TV is programme interruption by the commercials.

Access to information is a fundamental right of every learner. In a society that increasingly relies on ICT to communicate and share information and knowledge, it is essential that the information must be provided in such a way that every person has the opportunity of participating on an equal basis. Thus worldwide TV plays an important role in disseminating knowledge, especially in remote areas. Educational programmes transported via satellite have an important role in most less-developed countries /**2**/.

TV is, therefore, one of the more important tools for the presentation of learning contents to learners. We need to teach and educate so called Facebook and YouTube generation with digital contents when and where they want it /**3**/. The use of new technologies has an important impact on education. The new generation of connected TV can be classified as one of the device segments in ICT and, as such, an important education tool for the next learner generations. This paper researches the role of state of the art hybrid television techniques within present and future education. It presents a survey on use of the next-generation of televisions for every day users, and as a tool for educational needs.

Modern computer technology and the development of telecommunication systems, have allowed the efficient transmission of streaming video over the Internet. Systems for digital mounting, storage, and transmission are spreading and becoming price-wise accessible.

The main meaning of the video lecturers over the web was to enhance applicability and access to video-supported technologies in order to integrate marginal groups into society, and the process of distance-learning. Our research belongs on studies of future TV implementation techniques in field of education. A questionnaire was involved to a group of teachers and students. The evaluation of the answer results we uses as the guidelines to explore and develop tools and technologies of advanced teaching, especially where video technologies, future TV's and ICT plays an important role. This paper is organized as follows. The next section describes the transition method of learner and learners into a virtual space of education, where time framework and a research methodology are presented. Section 3 presents the evaluation and discussion of questionnaire results. Section 4 gives a evolution of TV development. After a brief review of history of television and the transition from analogue to digital technologies, a future generation of hybrid television, Web TV and opportunities in education are discussed. The development of modern learning, supported by today's high-technology level of information and communication technology is also presented, in Section 5. This section gives the process of lecture-recording and online-sharing through video portals with some examples. The last section concludes with evaluation of the achieved results.

2. The transition of learner and learners into a virtual space of education

A number of Universities worldwide already recognise the advantages of video-supported learning lectures /**4**/. Many institutions now have an active video server with available educational contents, live or on demand. At the University of Maribor, a Center for Distance Education Development financed by the EU Program Phare Access Project was established 2001. One of the first introductions to streaming video-supported web lectures was given as a doctorate dissertation. Additionally, a number of different video lectures were available live and on demand on two video servers. Unfortunately, a lot of hitches, such as staff costs or the consuming lecture preparation (capturing, editing), led to the cancellation of this project. Whilst a many changes have happened in the last years, technically and in the thoughts of universities staff, the idea of video lectures has again become a topic.

2.1 Time framework of the research

Since 2001, our main topic has been researching the impact of ICT, especially video technologies, regarding learning and learners. The main question was how the lectures are presented, processed, and transformed from traditional to new media. Over the last few years we have been focusing on the applications of media to web and how the learning materials can be effectively performed through new media technologies, i.e. IPTV, WebTV, and especially Smart TV. Our research focused in two directions. Firstly, we traced the development of Web technologies for transmiting video-content online. Being involved in many EU projects, we have developed web-based tools for the efficient transfer of educational content including video-streaming online, especially for learners with different types of special educational needs. Recent experience in this area was our membership as a partner within the EU project I-access (2010/12). The collective results of I-access project led to guiding principles and key areas for recommendations to support accessible information provision for lifelong learning as agreed at the European level by the key stakeholders in this field /**5**/.

From impact and effective research into education, it has been seen that the majority of lecturers and learners have a positively adopted this new form of education, but with some reservations. For lecturers, these concerns are following:

- increased complexity, and time-consumption when producing materials,
- eventual additional cost for technically qualified staff (i.e. recording and editing),
- Additional maintainonce costs for ICT.

Although the fact that students (especially those with special needs) were to receive an excellent new service, in the beginning some difficulties appeared due to the poor ICT

equipment available to learners. However, over the past few years, broadband access standards and ICT have improved enormously, and these problems have disappeared. Also, equipment for video production is now cheaper, and the transfer of video content online is simpler.

At the same time, more and more educational institutions have realised the importance and role of video as a tool for the promotion and support of classical education /**6**/. Universities also want to go where the learners are to share their rich scientific and intellectual knowledge beyond the walls of the academy and to expand the boundaries of the classroom. This desire has become a critical need, as the worldwide economy calls for advanced education and training.

Universities and companies for streaming the contents generally use their own special video servers, whilst smaller institutions use mainly public video portals such as YouTube and Vimeo /**7**/.

The presented studies explored the advantages and concerns about video-sharing technologies on public video portals. TV (in conjunction with a VCR) has played an important role in education /**8**/. With the popularity of personal computers as education tools within a classrooms TV has completely lost its importance. Today TV displays can be practically viewed as specialised computer equipped for larger display. The return of TV into the classroom as an education tool is highly possible. Large and high-quality displays are very practical for any kind of presentation to a larger audience group, while modern displays can also reach extremely high levels of picture brightness. The aim of our research is to explore the role of future generation television technologies in education.

The research we divide in several parts. The aim of the first part was:

- to monitor and compare the development of new ICT as a tool for learning through video technologies,
- comparing the ICT tools with the new television technology, to predict and determine the role of the modern television as an educational tool.

The results presented were also gained from experiences gained when participating in several international projects, where we were active as developers of new technologies regarding distance-learning needs, especially for groups of learners with special needs (Tempus Phare - Detech, Phare Access - Visiocom, Socrates Grundtvig Bitema, Support, I-Access) . The second part of the research involved the needs and requirements of today's teachers and students in conjunction with video lecturers. The survey tried to determine the role of education with the help of video-supported lectures within a university environment. We were interested in the importance and roles of more and more popular public video portals such as YouTube and Vimeo, and how their popularity increased. Is it possible to predict weather such portals could impact on education as such. The empirical part of the research was performed from academic year 2011/12. The last part of the research included monitoring the development of new technology TV displays.

2.2 Methodological concept of the research

Students and teachers were invited to participate in anonymous online questionnaires. The goal was to research where we are today in regards to video-supported lectures within the university. The anonymous online questionnaire was presented and completed by university lecturers (n=38) and students (n=122) of the following studies (academic year 2011/12):

- Computer Science and Information Technologies (n=24)
- Telecommunication (n=8)
- Media Communications (n=71)
- Electronics (n=19)

In total, 38 lecturer from 60 (University of Zagreb n=21/30, University of Maribor n=17/30) and 122 students from 152 (University of Maribor, @ Faculty of Electrical Engineering and Computer Science) in academic year 2011/12 responded. The statistic analysis of statement grades was done with Excel.

3. The result of the questionnaire competition

When the evaluating of the results we first examined what were the lecturer's needs and priorities. Our study involved online question-

naires with evaluation of feedback reports. Participants answered eight questions with a rating scale from 1 equals ″Not agree″, and 5 equals ″Fully agree″. The second examination was made within a group of students (n=122) in order to explore their views, wishes and concerns relating to video-lecturers available online. The results from their answers are listed in Table 1.The particular question can be found in the first column of Table 1. The second column gives the mean's calculations to each particular lecturer's answers. The third column gives the number of calculated standard deviation. The fourth column reports the mean and fifth column the standard deviation calculated from students answers. From a significance criterion calculation we consider the significance of tests. The probabilities criterion of 5% and 1%, show the rejection of hypothesis $H_0(a_1=a_2)$ that mean values of both populations are the same. The fifth and sixth column of the table reports if hypothesis to question is rejected or not.

Table 1: Impact of video-sharing technologies on online videos for education purposes, from lecturers' and students' view points

Question	mean lecturers	st.dev	mean students	st.dev	α=0,05	α=0,01
Videos an important educational tool	3.55	0.950	4.11	0.955	rejected	rejected
Do you use online video for your own research or professional work, or to collect new ideas	3.05	1.03	4.15	0.82	rejected	rejected
I trust private (non-public) video-sharing technologies, rather than public (like You tube)	1.89	1.00	1.90	1.138	not rejected	not rejected
Searching for educational content on online video-sharing portals is simple and effective	2.13	1.07	3.35	0.85	rejected	rejected
Public video server portals are an ideal platform for promotional purposes	4.15	0.95	4.18	0.88	not rejected	not rejected
The video is a supplement only to traditional (face-to face) lectures	3.67	0.94	3.11	1.01	rejected	rejected

Fig. 1 shows the *frequency distribution* of *means* resulted on question *„Video is an important educational tool"*.
The comparison of distribution and calculated mean from teachers/students answers show that more than 50% of students answers gives video the highest importance as future educational tool.

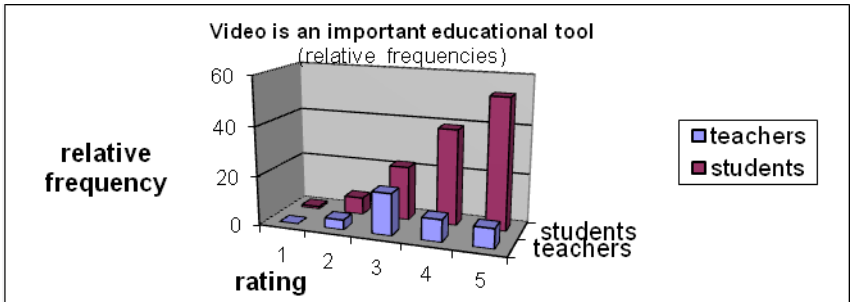

Figure 1. Chart of relative frequency related to importance of video as educational tool.

Fig. 2 shows the *frequency distribution* of *means* resulted on question *„Public video server portals are ideal as a platform for promotional purposes“*. The comparison of *mean frequency distribution* from teachers/students answers show that more than 50% of students answers give video the highest importance's future educational tool.

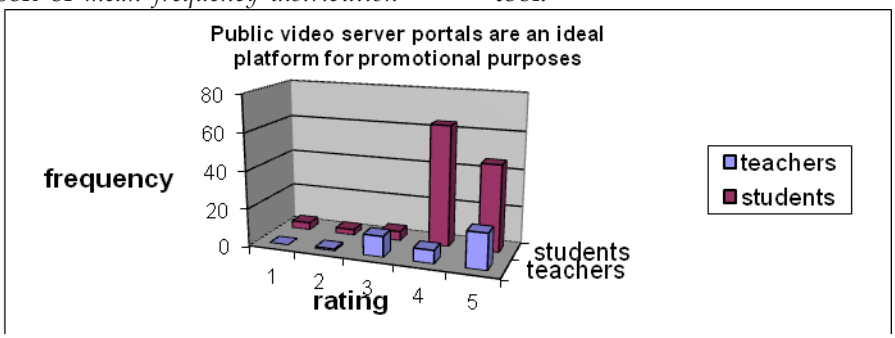

Figure 2. Chart ″Public video server portals are ideal as a platform for promotional purposes″.

It is clear that relationship regarding video support as a learning-tool has a much higher impact on students rather than on lecturers. It is obviously that today's generation of students expect online video lecturers as a new standard. Their view is clear. The video lecturers should be available as a support to the traditional lectures. They agree that a caption of lectures is an ideal additional service to the traditional way of education. Generally some of the negative comments belonged to the qualities of the recorded lecturers (worse sound, insufficient picture quality), and to ineffective search engines. Almost all agreed that video learning is becoming an important part of learning regarding general needs.

4. The history and development of TV technologies

The development of television and its cameras goes back to the early 1940's /**9**/. Television becomes more and more a part of everyday life. A decade later, the first television sets became intrical parts of family homes. Whilst black-and-white television (B&W TV) was broadcasting monochromatic images, colour television was created to transmit pictures in colour in the form of three monochrome images: red, green and blue (RGB). Blending these three images together produced a full colour image for the viewer. Broadcasting in colour started in early 1954 in the USA, where the NTSC standard for colour television was adopted /**10**/. However, a decision to adopt a modified 625-line system for monochrome transmissions (with a lower rate, a higher overall bandwidth) delayed the development of European colour TV. Europeans could not directly transfer the U.S. colour standard NTSC. The performance of NTSC and SECAM implementations dissatisfied the Germans. A new PAL (phase alternating line) standard was adopted. The first colour broadcasts in Europe (England) actually started in 1967. Today, these are three main analogue broadcast television systems in usage around the world, PAL (Phase Alternating Line), NTSC (National Television System Committee) and SECAM (Séquentiel Couleur à Mémoire—Sequential Colour with Memory). The North America used NTSC, most European countries PAL with the exception on France, where still SECAM system is in use. For many years the cathode ray tube (CRT) monitor was the only technology for TV screens. CRT's were produced for decades only in 4:3 aspect ratio, in the late 1980's came the alternative CRT models for viewing in 16:9.

4.1 The transition from analogue to digital technologies

The video signal started as an analogue and has developed into digital with a huge number of digital formats. In today's digital society, the camera size has became smaller and the qualities of images continue to improve. Digital television (DTV) is the transmission of audio and video by digitally-processed and multiplexed signals, in contrast to the totally analogue and channel-separated signals used by

analogue TV /**11**/. Many countries have replaced broadcast analogue television (Slovenia in December 2010) with digital television to allow other uses (digital dividend) of the television radio spectrum.

Today digital television supports many different picture formats as defined by the broadcast television systems, beeing a combination of size and aspect ratios. The production of CRT models closed some years ago whilst flat panel displays have clear advantages in terms of depth, longevity, and their insensitivity to magnetic fields. A new generation of flat panel TV's produce accurate and stable pictures (saturated colours, natural skin tone). Some initial problems for digital flat-panel such as motion blurring, de-interlacing, motion judder; unstable colours, and unstable brightness have already been fully eliminated.

The range of formats can be broadly divided into two categories: high-definition television (HDTV) for the transmission of high-definition video and standard-definition television (SDTV). The determination of high-definition digital TV standard is a 16:9 aspect ratio by a picture resolution of 1920x1080 pixels and a frame-rate of 25 progressive pictures per second. Although standard-definition (3:4 aspect ratio and frame-rate of 50 interlaced frames) is great for small and medium-sized displays but once the screen size diagonal gets above 30 inch, the lines become highly visible. Projection receivers, home theatre systems, and large flat screens demand higher resolution to equal the experience of watching 35-mm film.

Whilst in most European homes a flat digital TV set is already present and ready to receive signals in HD, the change from SDTV to HDTV has become a long and very slow process. Nevertheless, some broadcasters in the US and EU transmit their programmes not only in HD but also in 3D.

The fact is that the development of TV technology over the last decade has been enormous. The question arises as to how all those technology, real improvements, and the development of the next generation TV's will benefit everyday education. TV was used as a tool for education in the last century, especially language learning. TV as an educational tool has been reduced in total by the usage of computers within the classrooms. Today a new generation TV connected to the internet has become smart, and has again obtained important role as a education tool, primarily for informal education.

4.2 Future generation of Hybrid TV's and their opportunities in education

Today TV's are becoming better and smarter than ever before, by being connected to the internet. Smart TV and the delivery of multimedia content to the home via the Internet are also becoming increasingly common, although such content is often viewed on a PC or fed to a TV screen from a PC via a media player connected to a home network. The hybrid between the PC and the classical TV has become 'a Hybrid TV' or 'Smart TV'. It is intend to extend the reach of multimedia content directly to the television set in a seamless, viewer-friendly manner, and to enable the TV viewer to more conveniently access both the broadcast digital and Internet multimedia contents (Internet Protocol TV) on a TV set using a single remote control/box and a single on-screen interface. Services delivered through Hybrid TV include traditional broadcast TV channels, video-on-demand (VOD), Electronic programme Guide (EPG) , voting, social networking, and other services. A hybrid TV enables users to view all of these advanced services on their flat screen TV, via a single device.

The next digital generation TV is a Hybrid television (HBB TV). Hybrid digital TV can show content from a number of different sources including traditionally broadcast TV, the internet, and connected devices within the home. To watch hybrid digital TV, users will need a hybrid IPTV set-top box with a range of input connectors, including Ethernet as well as at least one tuner for receiving broadcast TV signals. The tuner in a hybrid set-top box can be digital terrestrial (DVB-T), digital cable (DVB-C), and digital satellite (DVB-S).

The reception of digital TV is well-established in many countries. Whilst most customers receive TV signal over cable or terrestrial media delivery by broadband, internet is an important issue. Within five years, 50% of broad-

casters connections in Europe will come via broadband internet. Decisions about how to use the radio spectrum are taken nationally, within the international interference requirements of the ITU. For tomorrow's media delivery via broadband, these regulations will no longer have any importance, whilst with the internet, nations will not be masters of their own domains. The internet will become a worldwide system of media delivery /**12**/. Authors /**13**/ consider Internet not just as a transmission medium but also as an effective systems for promoting creativity and innovation. They claim for the need for new approach to the intellectual property management, so that the solutions will provide adequate incentives and rewards to content creators and a wide range of content for users, without unnecessarily restricting the rights of others.

Google started with an open platform strategy as new service, that integrates internet applications together with the traditional TV. Viewers can search to find a video content they want to watch. It opens the living room to the web, making all television content more relevant and engaging. Live TV options have risen to the top of the search results due to Google TV's integration with existing cable, satellite, terrestrial, and IPTV subscriptions. A hint, applications are only available when software platforms are pre-installed on devices (TV or Set-top box). Until now, only two manufacturers deliver Google TV products.

Hybrid TV or Smart TV also offers an excellent opportunity for educational purposes. Being built-in, Google TV provides access to educational videos material that is available on the YouTube video portal. The TV-installed browser enables the user access to all the traditional available educational contents and to other video portal sites as well.

4.3 Additional broadcast services

The fact is that broadcasters will also target their programmes towards the audience who may have less time to watch programmes live, or forget to record them. Most European broadcasters now allow viewers to download contents for viewing on different (on as many platforms as possible) portable players, and who want to take video in this way. Some strictly require payment, whilst others give the service for free. Downloads are time-restricted and expire after viewing, or remain for 7 to 30 days, or similar. Only British BBC archives has more than a Million hours of video and audio programmes to make it possible for availability on the Web. Depending on the outcome it is considering offering the combination of a free and commercially-available content from the archives. Similarly, the same models are accepted by broadcasters in other EU countries (Netherland, Germany, France, and Slovenia). National broadcaster RTV Slovenia /**14**/ established the Multimedia Centre (MMC) at the end of 2001. It includes internet and mobile portals, which produce tele-texting, websites with extensive video and audio archives, a mobile portal (www.rtvslo.si/pda), and three info-channels (children's, entertaining and informative). Besides the already mentioned, the also MMC provides the subtitling of RTV Slovenia broadcasts for deaf and hard of hearing. Slovenia biggest commercial broadcaster POPTV invented multimedia portal VOYO. On demand available contents are payable per month. They offer two weeks testing period for free. The contents can be viewed on a PC's and on smart TV's (Panasonics, Philips).

4.4 Web TV and online video-sharing services

Online video-sharing services, such as YouTube, Toudou, Vimeo and others, allow users to upload, and share and view audio and video materials. The transferring of specialized educational content also allows some other public media portals. Table 2 lists some of more popular public video-portals. The range of popularity for listed Web portals was obtained by Alexa Site Rank portal (April 2012).

YouTube, since its creation in 2005, has grown into a leading online video-sharing destination. The grooving curve can be obtained from the YouTube portal /**15**/. At the end of its first 5 years of service, YouTube was receiving more than 4 billion views per day (YouTube, 2012), with over 800 million unique users visiting each month Each month users were uploading more than 60 hours of video per minute and

Alexa (http://www.alexa.com/topsites-2012) ranked it amongst the top three more highly visited websites (Google, Facebook, YouTube). The millions of video clips on YouTube represent a broad spectrum of user interests including those of educators, scholars, and researchers. YouTube EDU (http://www.youtube.com/edu) illustrates a portion of the growing academic presence on YouTube as colleges and universities establish institutional channels through which they share videotaped lectures and campus events. YouTube has become a topic of discussion and inquiry within the scholarly literature as educators and researchers grapple with questions about the possibilities and problems associated with social media.

Table 2. Online video portal services

Online Video Service	Alexa Site Rank	Monthly Unique Visitors
YouTube	3	800 Mio
Tudou	84	230 Mio
Vimeo	108	70 Mio
Flickr	33	-
MyVideo	2103	30 Mio
Blip.tv	2,919	300 Mio

The video sharing portal Vimeo has 65 million unique visitors per month and more than 8 million registered users. Vimeo has launched mobile apps for Android and Windows Phone 7 devices. Alexa ranked Vimeo in place 118 (2012). Vimeo announced support for High Definition playback in 1280x720 (720p), becoming the first video sharing site to support consumer HD. Since 2010, all videos are encoded into H.264 for HTML5 support.

MyVideo.de is Germany's leading video delivery service and has been at the forefront of the user-generated video sharing industry since early 2006.The site provides users with a portal to upload, view and share videos for the German-language market. With free access provided to more than one and a half million videos, the site is growing steadily, servicing more than 8 million video views per day - an increase of more than one million per day in only four months. Users can share links with friends and family, as well as rate and comment on the videos.

5. Video supported learning, lecture-recording and online-sharing

Learning supported by video technologies is not a yesterday topic, but it is only in the last seven years that the quantity and quality recording lessons have reached a level that makes lecture-recording and online sharing for formal education.

The Internet and the development of modern technologies are changing our methods of communication. With the rapid development of ICT, Networking and Communication technologies, have obtained the processes for distance learning through multimedia. Teaching, supported by today's high-technology level of information and communication technology (ICT) is a modern form of implementing the educational process.

Distance-learning is a form of indirect education, enabling students to study at home. Studying by distance means that the students and lecturers are physically separated and the training material is accessible at any time. Video is only one media form of knowledge transmission to be used during distance education. The education video files can be transferred over satellite, cable or streamed over the global telecommunications network. Before video can be streamed it must go through several processing stages. The streaming process starts with a video camera. The signal is recorded for later editing or transmitted online (live, without editing). There are many similarities between TV and computer video, but

there are minor differences in the standards and formats.

After being recorded by a digital camera, video can be transmitted to the computer in compressed or non compressed forms over a FireWire connection, USB, wireless or tapeless (file transmission). When individual clips are stored on a hard disk, digital mounting begins. This procedure is composed of: cutting the video to shorter clips, the adding of sound and visual effects, video coding and transmission to other media. Finally, the end-product is then prepared for storing to another media for presentation - CD, DVD, USB or a video-server.

Today, many video-editing tools are available for preparing video lecturers. There is a selection of free editing programs, like Movie Maker for Windows, i-Movie Mac, Avid FreeDV (Windows, Mac OS), Cinerela (Linux), and others. To maximize the creativity and productivity probably one of the professional video-editing tool should be used: Adobe Premiere (Windows, Mac OS), Final Cut Pro (Mac OS), Sony Vegas, or Avid Media Composer. The future of video-editing is moving to 'the Cloud'; Adobe is already preparing to move their products to Cloud in the near future. While the traditional licenses of software will still be offered, Cloud-computing will again offer some benefits to desktop software. The You Tube video Cloud editor enables simple tasks such as trimming or adding sounds. Additionally, it enables the collection of multiple short clips into one longer video file.

Applications in the field of automatic lecture-recordings for e-learning needs have exponentially grown worldwide. For the most part, these technologies were originally developed as research projects. Within the commercial domain, iTunes and YouTube have recognised these efforts and provided innovative distribution platforms for exploiting the increasing of this content. Beside YouTube, iTunes and other public video portal services there exists some other working examples that are related to this field of application. An Opencast Community was announced by UC Berkley to all interested institutions including commercial providers. The collaboration between 13 partners result in the Opencast Matterhorn Project, an open-source software development project to develop video capture and management technologies that are of primary importance to the opencast community's mission. In 2012 the Opencast Matterhorn has been accepted by the Google Summer of Code (GSoC) program. Students who are interested in applying should connect the idea of Matterhorn into Google applications. One of the Matterhorn partners is the Josef Stefan Institute, which has the video portal videolecturers.net /16/. Videolecturers.net is an open access educational repository, which offers lectures given by scientists at important events such as conferences, workshops or scientific promotional events from many fields of Science. This portal also helps to promote knowledge, ideas, and science to the wide-public.

5.1 Learning oriented video web-portals

Applications and research in the field of lecture recordings, e-lectures, podcasts, and webcasts have exponentially grown worldwide. Particularly in German-speaking countries, applications for recording and distributing conferences and lectures have been developed for quite some time. The result is a number of quality Web portals where on demand lecturers are offered. Besidesat Universities, where captured lectures are almost standard, there are a number of Web portals providing some kind of video-learning materials. Some are strongly topic-specialised whilst others are more generalised. Germany Galileo portal /**17**/ offers digital books and online learning videos in the field of Computing, Design and ITC. They offer test lecturers for free. Video2brain (http://www.video2brain.com/en/redirected.htm) is a video portal operating since 2002. They offer courses (German and English) for the online streaming or downloading in the fields of web design, video, audio, business, and programming. Video2brain provides the most learning material in the German and English languages. On Lynda portal (http://www.lynda.com/), can be found similar programmes available in English. Some portals use more than one channel to bring their learning materials to the public. They give only selected chapters for free, and others

are available (as DVD, downloads or streaming) pay as you view. An imaginative concept staying in contact with customers is presented on the Karl Taylor web portal (http://www.photography-tips-online.com). It offers some free Photographic Courses for people interested in new methods of Digital photography. Generally today, it is already a standard and a must for almost all companies to be presented on the web using video-lecturers. This is a contemporary way of presenting products and how to help customers use the products in the most effective ways (Adobe, Nikon, Canon, Novoflex, and others).

6. Conclusion

Modern computer technology and the development of telecommunication systems allows for efficient transmission of streaming video via the Internet. With the proliferation of iTunes, Vimeo, and YouTube as mediums for sharing information and as learning portals, the necessity of investigating their effects has gained importance. Public video portals are a complex system involving a multitude of participants engaged in a constantly evolving mixture of interactions.

In spite of worldwide economic slowdown, the pace of multimedia technology development continues to increase. TV sets have gained HD resolution, internet connectivity, a processing unit, all which combined to provide a significant new functionality and use, for example, web-browsing, increased selection of video programming, videoconferencing, access to educational content through public or private portals, etc. From a passive viewing device, the TV set has been transformed into an internet appliance and a big screen multipurpose PC. As such a TV set can be recognized as an ideal education tool.

The results of our research show clearly that the 'gap' between the generations of students and teachers still exists. On the teachers side there are a series of concerns against lecture capturing and their presentations online, whilst today's generation of students expect online video lecturers as a new standard in education. From the students' point of view the video supported lecture should be a service already present at least as a support to the traditional lectures. The students are very clear in their demands. They expect contemporary online available lectures, produced in perfect sound and picture quality.

The fact is that the development of TV technology over the last decade has been enormous. It is obviously that new display technologies the television set as an educational tool has again become more important.The paper give the answers how all those new technology, real improvements, and the development of the next generation TV's will benefit everyday education.The video in conjunction with broadband internet is definitively the medium which is increasingly used worldwide. YouTube and other public providers of streaming video services allow downloading or streaming video in high-quality to anyone with connection to WWW. We assume that new technologies, other than PC, such as tablet computers, smart phones or large smart video displays will accelerate the demand for video lectures in the future.

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